RAILROAD GAZETTE

FRIDAY, OCTOBER 15.

Burning off Paint from Passenger Cars.

At the recent convention of the Master Car and Locomotive Painters' Association in Chicago, the following paper was read by Mr. R. McKeon, Secretary of the Association and Master Painter of the New York, Pennsylvania & Ohio road:

Although not appointed on this subject, yet I feel that it would be a neglect of duty to the company in whose interests I labor, as well as to the members of this association, did I fail to express my views on the question at issue, and therefore propose to take sides with the affirmative in what I shall present for your consideration.

We find that the resolution refers to the cars that are badly cracked. Now, a car that has a heavy body of paint and varnish on it is generally well protected. Although its appearance condemns it, there is a good protection to the sheathing, it is sound and well seasoned, for we rarely find the paint cracking down to the wood; the moisture has been dried out, and our object will be to show the economy there is in burning off the old cracked paint and repainting. We shall speak from a practical standpoint, from actual experience, having painted a large number of baggage and express cars, and never yet stripped them where the sheathing was sound. We claim that the seasoned lumber will hold paint longer than new; it has become hardened, the cells of the wood are filled with the priming of the original painting; the surface on the old covering can be brought up with one coat of paint less than on a new surface. This will save an outlay of $5.15. There is also a saving of $4 on the puttying if the sheathing is nailed on the surface, as most baggage cars are, so as to secure additional strength. Everything goes to show that removing the sheathing for cracked paint on its surface is wastefulness; it is showing a disregard for economy, and we even claim that if no additional expense was attached to putting on new sheathing, it would be preferable to use the old, for the additional wear the paint would give on the old seasoned wood.

Baggage cars burn off easily, and are left with a good surface, very little dressing being necessary after the burning is done. A sharp steel scraper and No. 2 sandpaper will complete the car, ready for priming, at a cost of $4 after it is burned off. The burning will cost $11, thus preparing the car for painting at an expense of $15; and this burning and cleaning up includes letter belt, doors and posts, which would be done if the car had new sheathing, and will cost $5 to burn off and dress up, thus leaving the actual expense of burning off and dressing up the sheathing ready to paint $10.

We claim, therefore, that the saving in burning off the cracked paint from the old sheathing in place of putting on new is $37.08, but we will give you an itemized statement of the expense of covering a car anew.

A 50-ft. baggage and express car, with double doors, will take about 88 ft. of sheathing, running measure, to cover it. White wood and pine are both used, the cost being about the same; this, taken after it leaves the planer, is worth $15.84; to clean it up ready for putting on the car will cost $7.92; the batten for the car ready for putting on costs 60 cents; labor tearing off the old ceiling and putting on the new is $16.92, and the nails required will cost $1. This gives the cost for material and labor putting on the sheathing $42.08, which with the extra coat of paint to bring up the surface and the puttying makes the difference in favor of burning off $41.23. There may be a slight variation from these figures, according to the build of the car, but this will give a fair average.

In view of the fact that we have shown you the first saving in the expense, let me establish another claim, and that is, the car that is painted on the old sheathing will wear one-half longer than the car that is painted on the new, that is, so far as the painting is concerned. I have observed this frequently, and a thorough investigation by any unprejudiced painter will convince him of the fact. No one will hesitate to acknowledge that the second painting on a car will give more wear than the first, for the reason that the wood is firmer and there is less expansion and contraction than in the new, fresh finishing lumber.

I will admit that it is all very nice for the painter to have no trouble removing cracked paint, but I think it is our place to economize when we can; it is money for the company to keep the old sheathing on their baggage, mail and express cars (as well as on coaches or any class of car) just so long as it exhibits no signs of decay. It will pay to burn off the paint, if necessary to do it, as long as the wood is sound. Of course if the painted surface is in good condition and free from cracking or scaling, it can be rubbed down and repainted without the burning, as it would be a waste of time and material to remove the sound paint just as much as it would be to tear off the sound sheathing.

The Ward Brake.

This new competitor which has been lately entered for the 1887 brake tests at Burlington, Ia., is thus described by the inventor:

A small steam cylinder is placed at the rear of the tender having a pusher-head at the outer end of the piston-rod, so that when steam is let into this cylinder the pusher-head is forced outward toward the train. That forces the one next it rearward, which has a lever connection to an adjustable longitudinal side rod, having a like connection at the other end of the car, so that, as the pusher-head is forced rearward at the car's forward end, the one at the other end is forced outward, and correspondingly acts on the following car, and so on throughout the train. When the engineer allows the steam to escape from the pusher-head cylinder these car pusher-heads return to rest by means of small coil springs enveloping a portion of their respective side rods, made operative in either direction, and thus release all the brakes of the train, ready for backing if need be.

By this arrangement the engineer has a working communication to each car of his train, without any connection between them. Through the push-rods connection is made with a friction-power-brake.

To prevent "bucking" of the cars (as the brakes set), the caboose man should remove a small cotter-pin in the brake operating rod for one or two of the rear cars, including that of the caboose, which will prevent brake action on said cars and allow of their pressing against the ones on which brake action is had, and also prevent the separating of pusher-heads or the releasing of any of the brakes until released by the engineer.

In backing the train the caboose men become brakemen by simply bringing into requisition a winding device (applied to the caboose for that purpose) which forces the pusher-head of the caboose out, and as effectually applies the brakes from the rear of the train, when backing, as is accomplished by the engineer when running forward.

It will be seen that it is of quite a different type from any of those tested at the late tests.

Contributions.

The Designer of the Old Columbia Railroad Bridge.

No. 3,301 HAVERFORD STREET,
PHILADELPHIA, Oct. 12, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of the 8th inst. you print an article copied from (and accredited to) the Philadelphia *Public Ledger* of 15th ultimo, giving an account of the construction, etc., of the old Columbia Railroad Bridge across the Schuylkill River near Peters' Island in this city, which is now being removed, and replaced by an iron truss bridge, by the Phœnix Bridge Co.

In this article occurs the misstatement that my father, John C. Trautwine, Sr., "planned the bridge and superintended its construction." Upon reading this in the *Ledger* I endeavored to ascertain who was really the designer, in order that I might give not only a negation of the erroneous statement, but also something positive in its place. In the meantime, however, Mr. W. Hasell Wilson relieved me of the necessity of doing so by writing to the *Ledger* that the bridge was designed by Maj. John Wilson, Chief Engineer, and that the construction was superintended by himself (Mr. W. Hassell Wilson, Principal Assistant Engineer), and Frederick Erdman, Bridge Inspector. Mr. Erdman is referred to as Superintendent of Construction by my father in his illustrated description of the structure in the *Franklin Institute Journal*, of August, 1834, a document from which many of the points in the *Ledger* article appear to have been taken.

The *Ledger* article states that "at the bottom the *piers* were about 80 ft. in length and 34 ft. in depth" (breadth). In my father's account these dimensions are given as those of the *coffer-dam* in which the piers were built.

JOHN C. TRAUTWINE, JR.

Reform in Bridge Buying.

PITTSBURGH, Pa., Oct. 12, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your editorials in your issues of Sept. 17 and Oct. 1 on "Good Practice in Bridge Buying" and "Heavy Bridges and Economy" are a very timely exposition of the shortcomings of present practice in railroad bridges.

In respect to railroad bridges it is in some respects the worst of all, as a result of the habit of inviting designs from bridge manufacturers on the basis of complex specifications issued to them, with bids by the lump sum per bridge. The more pedantic such specifications are on the details of dimensioning a bridge, the more literal and hair-spliting is their interpretation by the manufacturer, and "close sailing to the wind" and "skinning" is the legitimate result. Some of the specifications, lately issued, are more in the nature of essays on bridge construction, and the bewildered manufacturers, who are building bridges under half a dozen of such specifications at the same time, are sure to put each his own interpretation on them; and a great number of petty variations in strain sheets and designs for every little bridge bid on is the consequence.

Then, whoever "sails closest to the wind" and happens to be cheaper by $50 on a 150 ft. span "gets the job," according to frequent and senseless practice.

I have seen strain sheets returned to bridge works with corrections of stresses and dimensions, where the difference was less than three-tenths of one per cent., and where a variation of $\frac{1}{32}$-in. in the thickness of 6-in. bars in the same span was insisted upon. I know of frequent instances where the difference of $\frac{1}{16}$ in. in thickening plates for a pin bearing led to a long and disputatious correspondence.

Why should the bridge manufacturers be bothered by such a variety of specifications—essays on the points of dimensioning bridges, which really do not concern them as manufacturers, but rather the railroads, who use them?

The better practice, followed on many first-class railroads, is for each road to issue its own strain sheets and to invite from manufacturers (allowing them a certain freedom of design in details and connections) bids by the pound of material in the finished bridge. If any "skinning" is wanted it will then have to be done by the bridge buyer, who is at liberty to follow his own notions about bridge proportions uncontradicted.

Your remarks on the absurd and ridiculous "practice of setting up a certain imaginary locomotive and tender of assumed maximum weight with imaginary loads on imaginary wheels at imaginary distances apart, and then assuming that these are the greatest loads and the most disadvantageous distribution which will ever come on the bridge," cannot be too strongly and too emphatically indorsed. The ridiculousness of the whole pedantic performance is heightened by the assumed snake-like gentleness with which the imaginary locomotives and train are gliding over the structure, so as to obtain the uttermost exactitude and accuracy of trains, corrected down to small fractions of one per cent. of the imaginary effects, and thus save the last ounce of metal in the structure.

Your recommendation of a uniform train-load per lineal foot and an additional concentrated load for the floor members is not only more practical, but it would save a great and senseless waste of mental energy in the calculation besides. A trainload of 3,500 lbs. per lineal foot and 50,000 lbs. additional as concentrated load on one axle for the floor system is not too high an assumption for bridges built now to last for the next 50 years. Furthermore, the effects of these loads should be increased for short spans up to 150 ft., either by adding a certain percentage to the stresses or by using smaller unit strains, as is the practice already to a certain extent. Short spans suffer from their shortness in a two-fold way: 1. The impact from the moving load is greater. 2. The frequency of maximum loading is greater.

Commencing with 100 per cent. increase for spans of 25 ft. and less, and graduating down to 5 per cent. for 150 ft. spans would be a good rule; or similar results may be reached by a corresponding reduction of unit strains. When an express train thunders over a short bridge at the rate of 85 ft. per second, no one can tell what the stresses really are, but every body is aware that there should be an ample margin of safety to cover our ignorance on that point, and the margin so far allowed does not seem enough. For as you truly remark, there are incomputable effects, such as the effects from vibration, from counterweights in drivers and the unknown time needed for distribution of strains in the bridge, to increase the static strains.

We know from daily practice, that a weak bridge may be safely crossed by a slow train, when it would be very unsafe to cross it with a fast train. Still, in calculating bridges of more than 75 ft. spans present practice knows no distinction on that account. Therefore an excess in the assumed live load is perfectly justified.

If railroads would follow more generally the practice of issuing their own strain sheets and inviting bids by the pound, they would not only get better but cheaper bridges. The manufacturer has then to guard only against one kind of loss, that on his price per pound, and he can, therefore, figure closer than when he must guard also against loss from eventual mistakes in weight above his estimates.

This rule is also more just, because the railroad asks no gratuitous service from the manufacturer, who is at the expense of preparing strain sheets and designs that may be rejected without compensation to him, but must be paid for in the form of a higher price for the bridge by somebody. The above system still allows the manufacturer a certain freedom in connections and details, for which his shop may be particularly fitted up, on the only condition that such details must fulfill certain general requirements of the specifications.

For long spans and for large bridges competition in designs is of more legitimate use, and all such designs should then be paid for, whether used or not.

I do not agree with your statement that it is better to build two single-track spans in place of one double-track span, save "for very long spans and very short spans."

On the contrary, it is always better, and preferable, to build double-track bridges with two trusses only, not for the saving in material, which is, indeed, "a trifling and petty economy," but for these particular reasons:

1. The maximum stresses occur only when both tracks are loaded, which is, of course, a very much less frequent occurrence than two trains meeting on the bridge, so that the bridge will be less frequently strained to its maximum strains, whereas in a single track bridge the iron is strained to its maximum every time a train passes over it. Wöhler's laws are a sufficient justification of this practice.

2. The trusses or girders of a double-track bridge, being heavier than those of a single track, are safer in case of derailment or other train accidents. A double-track bridge has more room for the working of wrecking-car and for all track-work.

3. The double-track bridge is stiffer laterally than two single-track spans, in all cases.

There is, therefore, no advantage whatever in building two single spans in place of one double-track span, save for economy, when a single track road is changed to double track, and save for very short spans, of about the length of ordinary panels in framed bridges.

G. LINDENTHAL.

Compound Locomotive—Van Borries System—Hanover Railroad (Germany.)

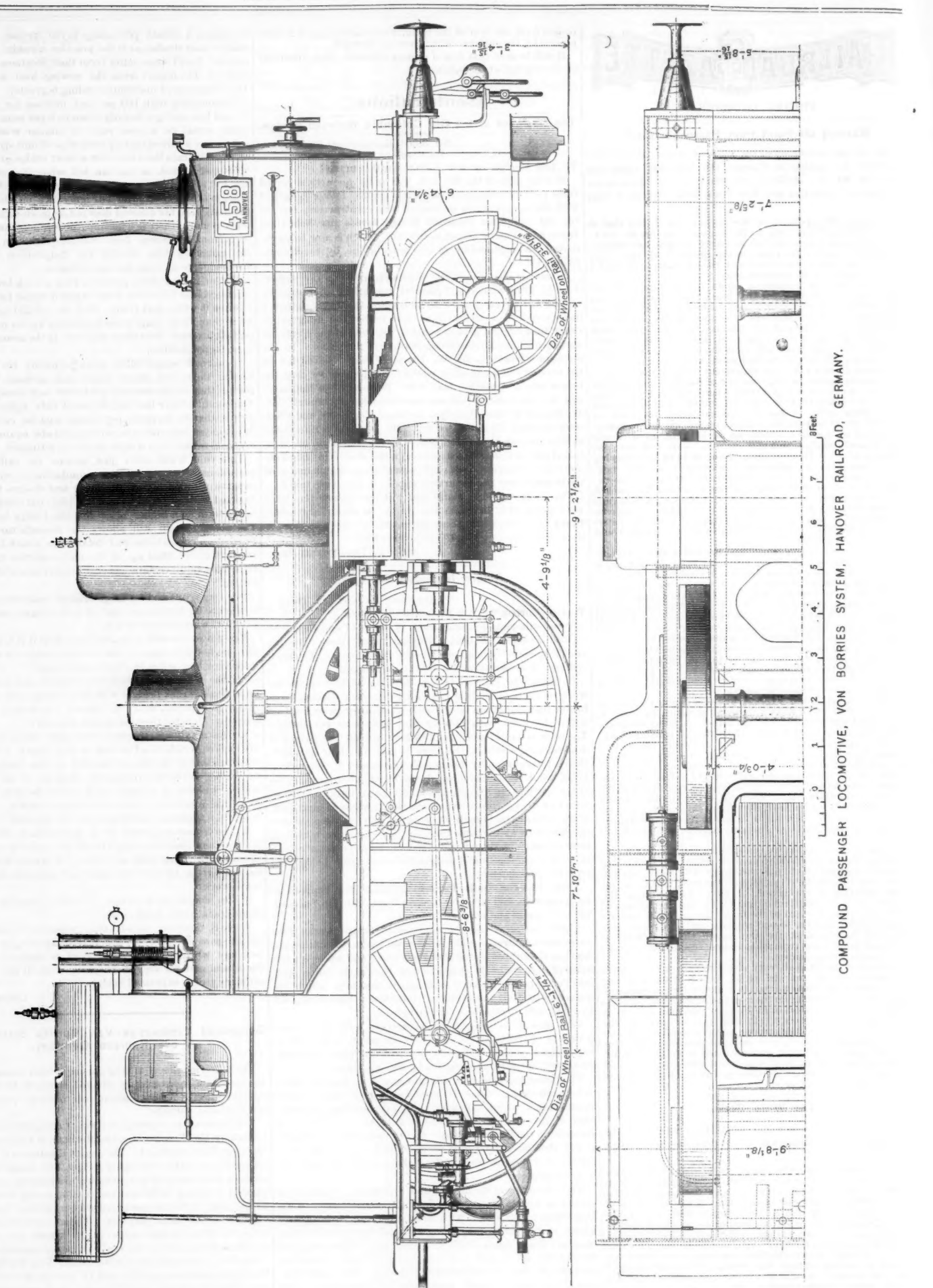
The following description of the engine and explanation of the system of compounding adopted is taken from the enlarged edition of *Recent Locomotives* recently published by the *Railroad Gazette*.

The illustrations represent a form of compound engine invented by Mr. Von Borries, the Mechanical Engineer of the Hanover State Railroad. The engine illustrated is intended for passenger traffic, but many freight and local traffic engines on this system of compounding are running in different parts of Germany with excellent results, saving from 14.3 to 21 per cent. of fuel as compared with ordinary locomotives engaged in the same services. These amounts are taken from the official figures according to which the engineers' and firemen's premiums for coal saving are calculated.

The first compound locomotive on the Von Borries system went into operation in 1880, and 18 were in operation on the Hanoverian railroads in 1885, with, it is said, entire satisfaction, while several have been built since.

The engine we now illustrate differs from the freight engines in having the cylinders set further back—undoubtedly avoiding, as claimed by Mr. Von Borries, much of the swaying and pitching caused by the excessive overhang of the usual German engine, which has the cylinders entirely in front of the leading wheels. On the other hand, there will be noted as unfavorable features the long steam and exhaust-pipes exposed to refrigeration, which must be particularly injurious with the high pressure carried (170 lbs.)

The compounding is effected by the use of two cylinders acting on cranks at right angles to one another. The high-pressure cylinder exhausts into a receiver placed underneath the boiler barrel and the low-pressure cylinder takes its supply of steam from this receiver. The passages connecting

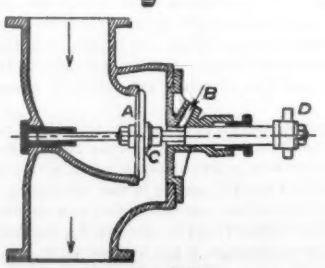


COMPOUND PASSENGER LOCOMOTIVE, VON BORRIES SYSTEM, HANOVER RAILROAD, GERMANY.

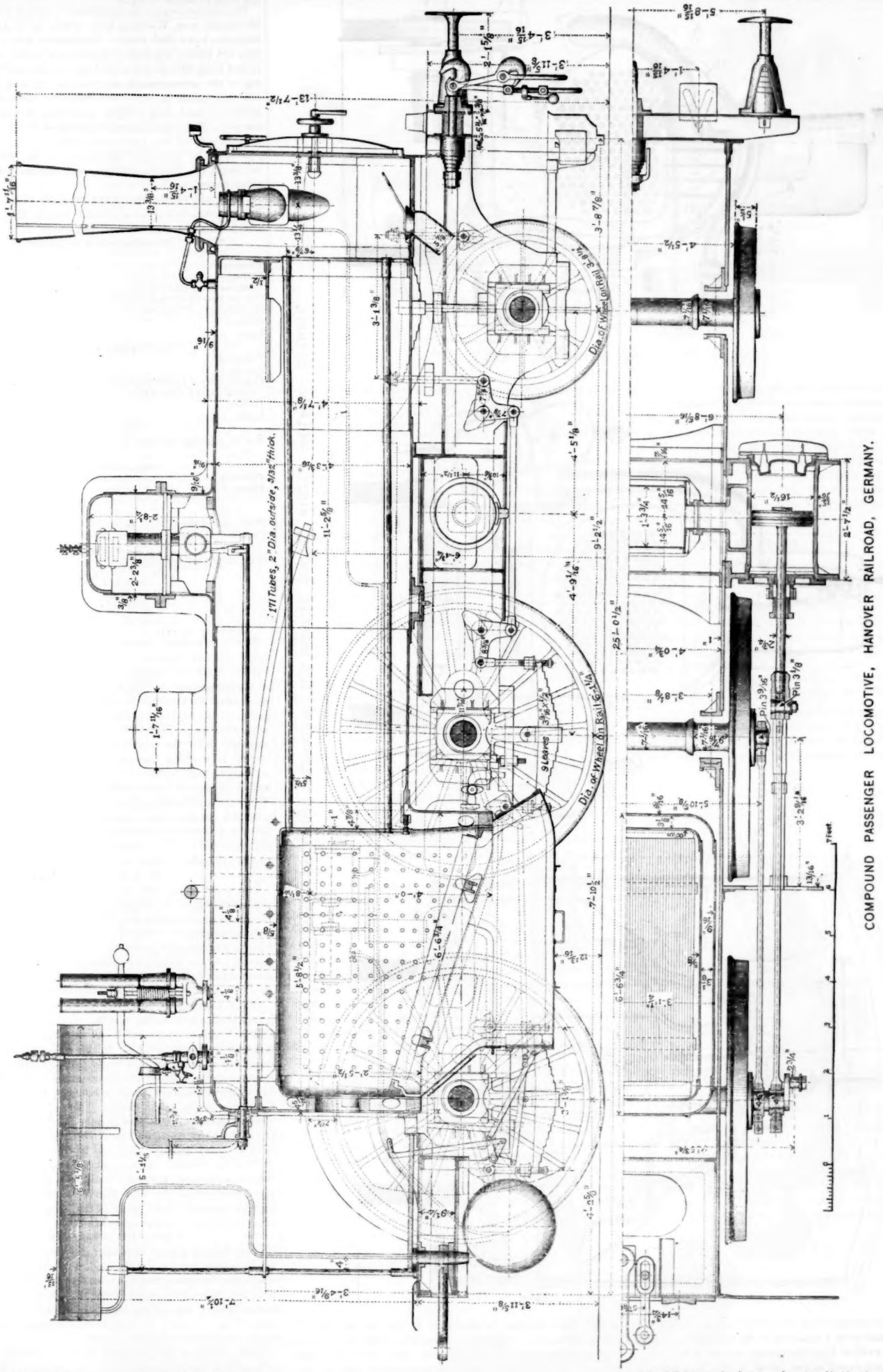
the cylinders and the receiver are clearly shown in the plan and cross-section of the engine.

When working compound the steam is only admitted to one cylinder, and as, with this arrangement, the engine might often stick on the centres and be unable to start, an arrangement is made by which, at starting, some steam can be admitted direct to the low-pressure cylinder, so that the engine can start readily, even if the high-pressure crank is on a dead centre. This valve closes automatically when the engine has taken one or two strokes.

The starting-valve is placed in the passage between the receiver and the low-pressure cylinder, but is not shown in the general views of the engine, but is, however, shown in detail. The arrows show the direction in which the exhaust steam flows from the high to the low-pressure cylinder when the engine is working compound. The spindle *D* can be operated from the cab by the engineer. A valve *A*, placed in the passage between the receiver and the low-pressure cylinder, is closed, as shown, before starting the engine. The closing of the valve allows steam from the boiler to enter the low-pressure cylinder through the opening *B* and a recess in the valve-spindle. The engine thus starts as an ordinary double-cylinder engine, the high-pressure cylinder exhausting into the closed receiver until the pressure therein becomes sufficient to open the valve *A* against the pressure of steam behind it. The valve *C* then closes the opening *B* and



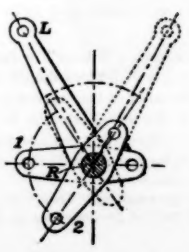
Starting Valve.



the engine goes on working compound. A flap-valve, may be substituted instead of the valve *A*.

The receiver of the locomotive illustrated is placed between the two cylinders, and the intercepting valve is placed on the side, where the receiver is connected to the low pressure valve-chest; it is, however, a more desirable arrangement to construct the receiver in the form of an arched pipe round the interior of the smoke-box, as is done by Mr. Webb, in order to superheat the steam passing through it. An arrangement of this kind is employed in the case of the compound freight engines on the same line.

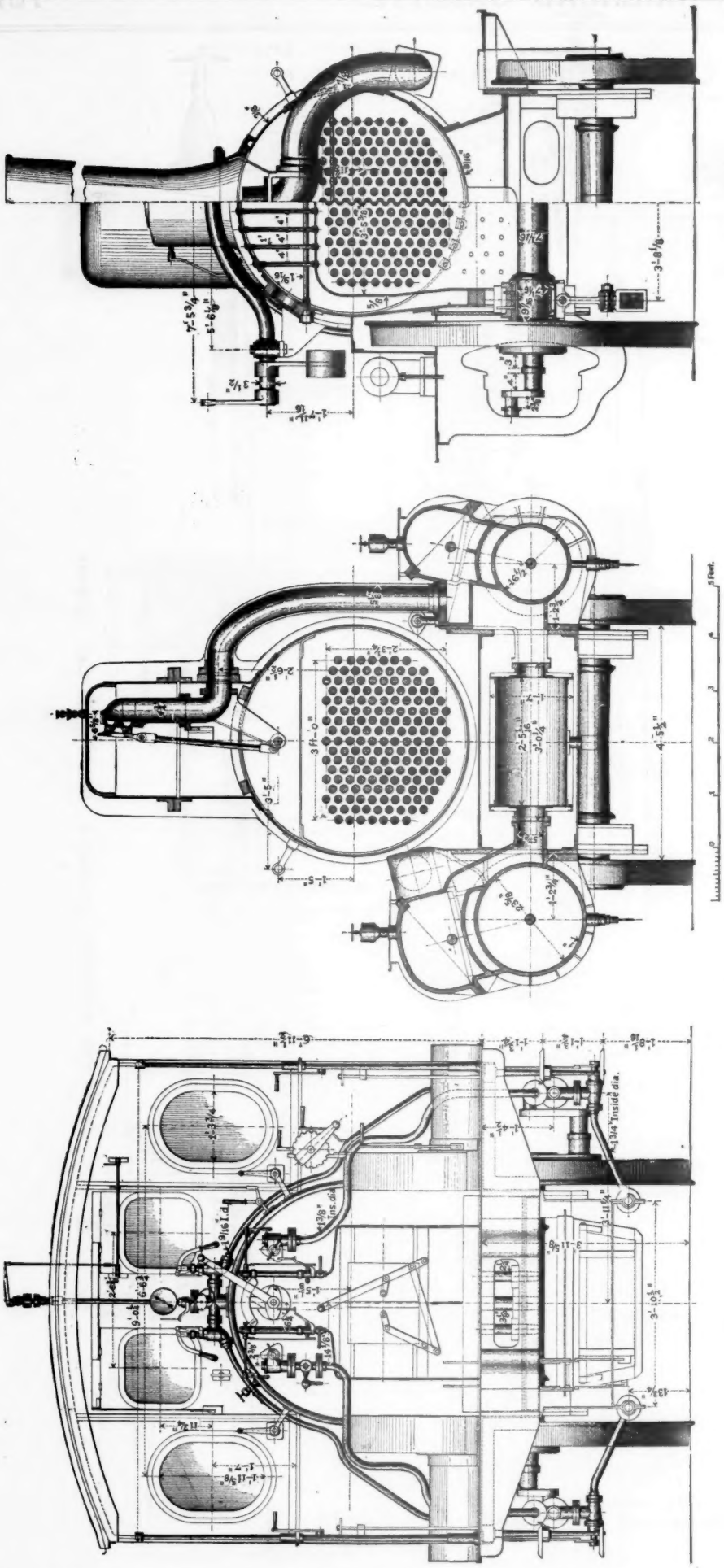
In the engine illustrated, the ratio of areas of the two cylinders is 1 to 2, which does not give each piston an equal working power. With ordinary valve motion a ratio of 1 to 2.25



Reversing Shaft.

or 1 to 2.3 is required in order to divide the power equally between the cylinders.

However, by taking these latter proportions, a rather awkward-sized low-pressure cylinder is obtained, and, therefore, Mr. Von Borries has adopted a ratio of 1 to 2, at the same time he has altered the reversing-gear in such a way that both cylinders, nevertheless, develop approximately equal powers. The alteration consists in a certain position of the levers of the reversing shaft *R* (see annexed fig.) Both levers 1 and 2 are of equal length and keyed on at a certain angle, and the corresponding suspension links attached to them are of different lengths. This is the only difference in comparison with the usual arrangement. As the weight-shaft reversing-arm *L* is notched up toward the centre, the lever 2 at



COMPOUND PASSENGER LOCOMOTIVE, VON BORRIES SYSTEM, HANOVER RAILROAD, GERMANY.

tached to the low-pressure link moves through a smaller vertical distance than lever 1 attached to the high-pressure link. It is, therefore, evident that the block in the low-pressure link is not so much raised as the block in the high-pressure link. The latter will, therefore, cut off earlier than the low-pressure, when the reversing lever is notched up, though when in full gear the valve-gears for both cylinders cut off at the same point. The corresponding degrees of admission in forward gear are as follows:

High-pressure cylinder.	Low-pressure cylinder.
0.75	0 75
0 40	0.50
0.20	0.33

If the lever *L* be now pulled over to the backward position, the degrees of admission into the two cylinders become disproportionate (except that of .75, which is, however, equal on both sides) because the elevation of the two levers is, of course, changed to the contrary position. This is, however, of no consequence, as engines of this class only run tender first when being used for shunting purposes at stations, etc., which can be done by an admission of 0.75 without any disadvantage.

In order to avoid excessive "drop" or back pressure, the cut off in the low-pressure cylinders should bear a fixed relation to the ratio of the area of the cylinder.* In this case, the ratio being 1 to 2, the cut-off should be about ⅓. Mr. Von Borries attempts to meet this requirement by so arranging the lifting-arms of his weigh-shaft that the cut-off in the low-pressure cylinder shall not vary as much as the cut-off in the high-pressure cylinder.

The express engine, as illustrated, is fitted with gear of the Heusinger von Waldegg type, which is so largely used in Belgium, but called there "Walschaert gear." Of course it does not matter what kind of gear is adopted for these compound locomotives. For each type, a small alteration, according to the arrangement described above, will effect a suitable admission to the two cylinders. Even if Joy's valve-motion be used, only a slight alteration is required for that purpose. The boiler pressure employed in Mr. Von Borries' engines is 170.7 lbs. per square inch.

Most of the principal dimensions of the engines will be be found on the illustrations, and further particulars are given below.

The details of the engine are generally in accordance with Prussian standards, but a greater length was given to the axle journals in order to diminish wear.

HIGH-PRESSURE CYLINDER.

	Ft.	In.
Diameter		16½
Stroke		22⅞
Centres of cylinders	6	8⅝
Centre line of cylinder to valve face	1	4¾
Outside lap of slide-valve		1 1/16
Inside " "		0 1/16
Lead " "		0 3/32

LOW-PRESSURE CYLINDER.

Diameter		23⅝
Stroke		22⅞
Centre line of cylinder to valve face	1	4⅞
Outside lap of slide-valve		1 1/16
Inside " "		none
Lead " "		0 3/32

TRACTIVE FORCE.

Per lb. average pressure in cyl. starting	127.5 lbs.
" " " " running	85 lbs.

HEATING SURFACE.

Fire-box	78.50 sq. ft.
Tubes	969.29 sq. ft.
Total	1,047.79 sq. ft.
Fire-grate area	18 73 sq. ft.
Pressure of steam	170.7 lbs. per sq. in.

WEIGHTS.

Weight of engine, empty	76,112 lbs.
" " in working order leading wheels	26,432 lbs.
" " " trailing "	28,672 lbs.
" " " driving "	28,672 lbs.
Total	83,776 lbs.

It will be noticed that the tractive power of the engine when working compound is considerably less than is usual in express engines of similar weight here. The tractive power at the moment of starting is high; but, as this power cannot exist after the receiver is full of exhaust steam at a high pressure, the engine cannot exert any great tractive pull for any distance. Therefore, any heavy incline must be mounted with the engine working compound. When the engine is working compound in the full-gear notch, the equivalent total degree of expansion is about 1 : 2.7, equivalent to a cut-off in a simple engine of about 37 per cent. With the high boiler pressure used, it is possible that even with this comparatively considerable degree of expansion, an average pressure of 100 lbs. per sq. in. might be obtained in the cylinders. The gross maximum tractive power of the engine, therefore, when working compound would be:

$$85 \times 100 = 8500 \text{ lbs.}$$

This is not a large amount for a coupled engine. The Chicago, Burlington & Quincy locomotive, illustrated in the *Railroad Gazette* June 18, 1886, has a tractive force per lb. average pressure in cylinders of 114 lbs., and could easily maintain an average pressure of 110 lbs. per sq. in. on the pistons. Under these circumstances, the maximum tractive power when mounting a long grade would be about:

$$114 \times 110 = 12{,}540 \text{ lbs.}$$

This is 45 per cent. in excess of the power that the compound could exert under similar circumstances, and shows that this type of compound is not suitable for a line in which there are any steep grades. In this respect, it is indeed very similar to an engine with a single pair of drivers. The Great Eastern and the Great Northern express locomotives have single drivers and are specially intended for high speeds and not for mounting heavy grades. The Great Northern engine works a maximum gradient of only 50 ft. to the mile, and the Great Eastern engine one of 75 ft. to the mile. The portions of their respective lines that have heavier gradients are worked by coupled engines with greater cylinder power. Both these engines, however, could haul a heavier train on a given grade than the Von Borries compound. The Great Eastern express is the lighter of the two, but could exert a gross maximum tractive force as under:

$$86 \times 105 = 9{,}030 \text{ lbs.}$$

These figures clearly show that the Von Borries compound is best suited for lines with moderate grades, and explains why some dissatisfaction has been felt at their performance with freight trains on hilly roads, though on more level lines their working has given complete satisfaction, and in all cases their economy in fuel has been most marked. An engine with a latest possible cut-off of 37 per cent., or 9 in., on 24-in. stroke would probably show considerable economy, especially if the expansion could be conducted without excessive wire-drawing, back pressure and cylinder condensation. These are, however, exactly the results obtained in the compound locomotive, and it is not, therefore, surprising that their economy is marked.

The following statement as to the advantages and rationale of the Von Borries system of compounding is taken from *Glaser's Annalen*, a technical paper published in Berlin:

"The advantage of compound working may be stated as follows: In the ordinary locomotive, with side valves and narrow ports, it is not very desirable to attempt more than three to fourfold expansion, and the steam is passed off at a pretty high temperature, which is utilized somewhat in the

* An explanation of the cause of "drop," etc., will be found in the enlarged edition of *Recent Locomotives*, p. 103.

second cylinder of the compound machine. Furthermore, the shell of the cylinder naturally takes the mean temperature of the steam passing through it; and as the temperature of the expanded steam falls below this, it absorbs, before passing into the stack, a certain amount of heat from the cylinder shell, which has to be replaced from the entering steam. This operation in a compound machine takes place in the low-pressure cylinder only, since the heat absorbed by the steam from the other cylinder is utilized in the low-pressure one. The steam lost in the clearance spaces and in the leakage around the piston of the high-pressure cylinder is also utilized, and a more uniform pressure on the piston is attained for the same degree of expansion.

"With steam cut off at one-quarter stroke, the greatest force of the steam is exerted where it is least effective and produces more friction, while if we get the same expansion by cutting off at one-half and expanded into another cylinder, the action of the steam is obviously more effective.

"By the possibility of expanding twofold while giving full steam to one cylinder, and attaining an eightfold expansion by cutting off at one-fourth, greater and more profitable range is given to the engineman in graduating his cut-off.

"With all these theoretical advantages, a practical average saving of fuel of 17.1 per cent. over locomotives of similar construction with ordinary cylinders has been attained. This result is the average of the collective working of three compound engines—respectively freight, passenger and omnibus engines—working against seven different ordinary engines of similar class and weight, for periods of from three to nine months each.

"The boiler pressure carried on the compounds was 180 lbs., while that of the other engines varied from 135 to 180 lbs.

"The valve-gear of these compound engines is just as simple as that of ordinary engines, the links for both cylinders being set by the same movement of the lever and not capable of separate adjustment.

"It is to be noted that in this system both slides receive together the pressure usually thrown upon one for a given quantity of steam used, causing less wear on the parts.

"Since the pressure on the pistons is more uniform throughout the stroke, and since the work is more equally divided between the pistons, these engines run very steadily; and this, with the smaller quantity of fuel burned, makes the repairs for machinery and boiler less than usual, in spite of the high boiler pressure carried.

"The great expansion of the steam diminishes the intensity of the blast so much as to cause little or no spark-throwing from the stack.

"To ascertain the necessary diameter d of the large cylinder, Mr. Von Borries uses the following formula:

$$d^2 = \frac{2\,Z\,D}{p\,h}$$

"Where Z = tractive force required = 0.14 to 0.16 of the adhesion weight (when allowance is made in Z for the external engine friction, taken as equal to that of the cars).

"D = driving-wheel diameter (inches).

"h = stroke (inches).

"p = mean effective steam pressure (after deducting internal machine friction) per square inch.

"This latter depends upon the comparative cross-sections of the two cylinders, and from experience and indicator experiments may be taken as follows:

	Relative section of cylinders.	p in per cent. of boiler pressure.	p for 180 lbs. in boilor.
Large engines, with tenders.	1:2	0.45	81.0 lbs.
Tank engines, " "	1:2.25 to 1:2.3	0.42	75.6 "

"Engines for long, heavy grades should be proportioned for Z = 0.16 adhesion weight, that they may have large enough cylinders: but 0.14 is usually enough.

"For passenger and express engines the size of the small cylinder may be made on the usual basis, and the large cylinder of double the section, and the boiler pressure increased 15 to 30 lbs.

"It is desirable in general to proportion these engines so that they may ordinarily work at one-fourth to one-third cut-off.

"A compound engine of this kind will pull, according to Mr. Von Borries, 10 to 15 per cent. more than an ordinary locomotive with the same heating surface and grate area.

"The receiver between the cylinders is best constituted by a pipe passing, if possible, through the smoke-box, and if not, over the boiler, lying close to it and well protected from cooling off. The cubic content of this connection-pipe should not be less than that of the small cylinder, and it is better larger, in order to avoid too unequal back-pressure on the small piston.

"In order to give as much power as possible for starting, it is necessary to bring pressure at once on both pistons. For this purpose an ingenious stop-valve has been contrived by Mr. Von Borries. This valve is placed in the connection pipe between the cylinders, and when the throttle is first opened a small port gives entrance to steam behind the valve and holds it to a seat over the exhaust from the small cylinder, and allows the pressure from the boiler, reduced, however, by the small area of the port, to take effect on the large piston. As soon as the exhaust port of the small cylinder opens, the steam from this overpowers the pressure behind the stop-valve and forces it back to a seat, closing the small extra port above referred to. This port is then kept closed by the boiler pressure itself acting on a balancing device until opened by the driver by means of a special lever.

"Before opening the throttle, therefore, the engineer throws this lever over, and the opening of the throttle lets boiler steam into both cylinders, which access is suspended automatically as soon as the exhaust of the small cylinder opens.

"The steam from the stacks of these engines is somewhat damp. This is not a sign of foaming, but an indication of the more perfect extraction of the heat and power from the steam.

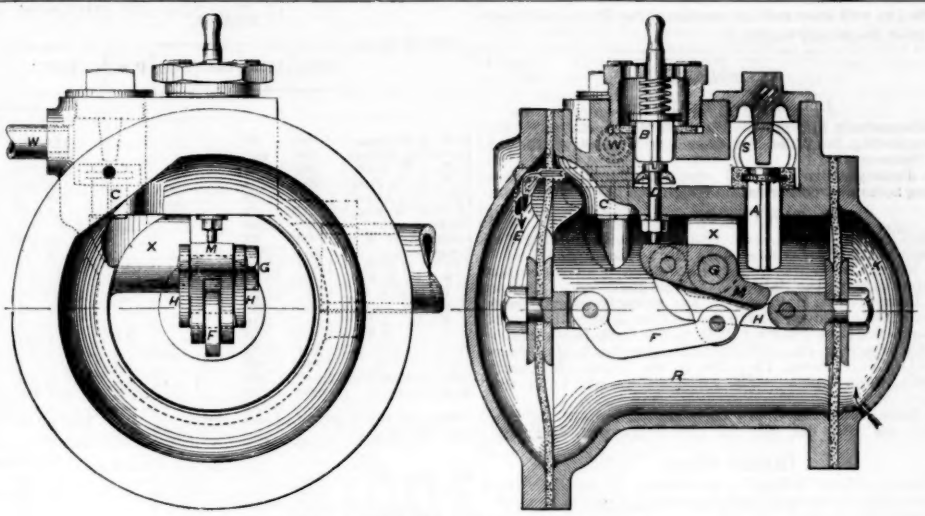
"These engines make plenty of steam, particularly in fast running. The exhaust nozzles can be made $\frac{1}{16}$ to $\frac{3}{16}$ in. wider than usual, owing to the more uniform quality of the blast, with its low pressure and two gentle impulses instead of four violent ones in every revolution.

"Mr. Von Borries sums up the cheap advantages of the compound engine very sensibly as follows: Better production of steam through more uniform blast, and better application of it through higher expansion and the possibility of getting a good expansion with very high pressure steam, without unduly increasing the friction.

"From the uniformly good results attained by the three different methods of Mallet in France, Webb in England, and Von Borries in Germany, and similarly good results by Worsdell in England, with an arrangement similar to Von Borries', it would seem as if the failure of the system to work on the Boston & Albany must have been due to an unsatisfactory application.

"The adverse experience with compound locomotives on the Kaiser Ferdinand Northern Railroad of Austria, which by its own account lay entirely in the heavy repairs, seems to have been due to their injudicious use of the Mallet system. In this there are two sets of valve-gear, to permit working either simple or compound; and the road in question found that in working high-pressure on both cylinders the unequal pressure racked the engine frame and working parts out of order.

"This high-pressure working, according to Mr. Von Borries' experience, is only necessary on the starting stroke, and he gets over the unequal pressure by contracting the throttles to the low-pressure cylinder."



EAMES AUTOMATIC CAR BRAKE VALVE.

Eames Automatic Brake Valve.

The device illustrated is that part of the Eames automatic vacuum brake which corresponds precisely in its functions to the "triple valve" of the Westinghouse brake, viz.: the valve to reverse the natural action of the pressure or vacuum in the train pipe, so that the brakes act when the pressure or vacuum in the train pipe is reduced. It will be seen, however, that its details and method of action are quite different, and it must be admitted that they are very ingenious and simple.

The interior of the case R is connected with the auxiliary reservoir, in which a vacuum is stored through the train pipe, W and check valve C. The chamber K back of the small diaphragm is open to the atmosphere. The bell crank M revolves on the fixed fulcrum G, and is connected with the larger diaphragm by link F at one angle, and with the small diaphragm by link H at another angle, so that the effective leverage of the larger diaphragm to revolve the bell crank is about four times that of the smaller diaphragm. The opening S connects with the brake diaphragm.

When the vacuum in the train pipe and reservoir is the same, the larger diaphragm is in equilibrium and the atmosphere pressing on the smaller diaphragm holds the levers as shown in the cut, and keeps the outlet valve B open to the atmosphere by means of the pin D.

If a little air is admitted to the train pipe in order to apply the brakes, a pressure is produced in the larger end chamber E, which is able to overcome the pressure at K, and the bell-crank begins to revolve. This revolution decreases the effective leverage of the larger diaphragm and increases that of the smaller diaphragm, so that a point is reached at which they balance each other and come to a rest. With the levers as shown the motion is $\frac{1}{32}$ in. for each inch of vacuum. A slight admission of air allows the outlet valve B to close. A further admission will open valve A, thus connecting the brake diaphragm with the auxiliary reservoir, and apply the brakes easily by producing a partial vacuum in the brake diaphragm at the expense of that in the auxiliary reservoir. This partial reduction of vacuum in the reservoir changes the equilibrium between the diaphragms and allows the valve A to close.

Full air pressure in the train pipe, as when the train breaks apart, moves the diaphragm its full stroke quickly and puts the brakes hard on. Hence it will be seen that by regulating the vacuum in the train pipe the engineer should have an excellent control over the brakes. As the diaphragms work without friction this valve ought naturally to be sensitive to slight changes of pressure in the train pipe and so respond promptly to the motion of the engineer's lever. The Eames Company claims that this feature of the device affords more perfect means of graduating the force of the brakes than any other, especially when it is desired to simply hold the train under control going down hill, and instances in proof of this the runs down hill at the Burlington tests, illustrated in our issue of Aug. 13, 1886, in which this brake certainly held nearer to the prescribed speed than any other. It is to be remembered, however, that only three trials were made of each brake, and that it is largely a matter of practice to handle any brake properly in that way, so that a greater number of tests would be more conclusive. So far as they went, however, they certainly gave a very excellent record for this feature of the device.

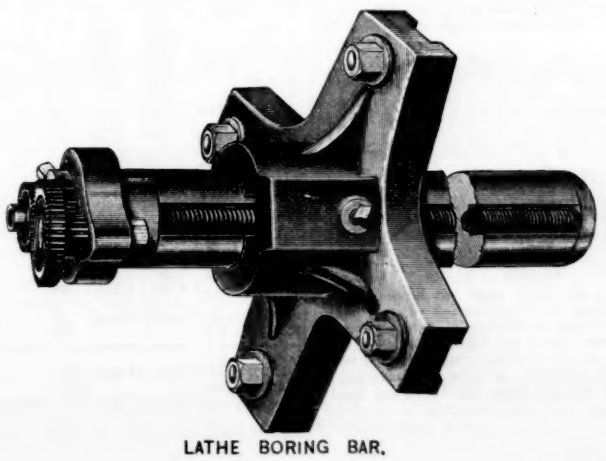
Lathe Boring-Bar.

The construction of this boring-bar, recently introduced by Messrs. Pedrick & Ayer, of Philadelphia, is made sufficiently clear by the engraving itself, without much description. It has hardened centres, an automatic constant feed by cut gears and with a steel feed-screw, the latter being fitted up with a bronze thrust-bearing, so as to keep out all lateral motion as perfectly as possible. The bars are accurately ground to gauge.

Cosgrove's Universal Vice Chuck.

The especial advantage claimed for this tool, which has been recently introduced by Messrs. Pedrick & Ayer, of Philadelphia, is its great range of positions. It is adapted to swing from a horizontal to a vertical position or to stand at any angle between the two, the graduated plate, shown at the very bottom of the engraving, serving for setting it at any desired angle horizontally, while it can be set at any angle in a vertical plane by means of the trunnion graduated arc, being clamped after setting by the two nuts, one of which is shown in the cut. This construction, it is not unreasonably claimed, greatly facilitates the milling or planing of pieces at an angle.

Cosgrove's Universal Vice Chuck.



LATHE BORING BAR.

The jaws, of hardened steel, open 8 in., with a depth of 2 in. The chuck is designed for use on planers, shapers, drill-presses, etc., as well as on milling machines, for which it is likely to be most frequently required.

TECHNICAL.

Locomotive Building.

The Schenectady Locomotive Works in Schenectady, N. Y., are completing an order for passenger locomotives for the West Shore road.

The Pennsylvania Railroad shops at Altoona, Pa., are building some new consolidation freight engines for the road.

The Car Shops.

The St. Charles Car Co., in St. Charles, Mo., is building 100 coal cars for the St. Louis, Alton & Terre Haute road.

The Milton Car Works at Milton, Pa., have an order for 1,000 box cars for the Baltimore & Ohio Railroad.

The Pennsylvania Railroad Co. has recently let contracts for box cars as follows; 200 to the Jackson & Woodin Manufacturing Co., Berwick, Pa.; 200 to the Carlisle Manufacturing Co., Carlisle, Pa.; 200 to the Pardee Car & Manufacturing Co., Watsontown, Pa.; 200 to the Allison Manufacturing Co., Philadelphia. The Altoona shops will build 400 more.

The Terre Haute Car Co. in Terre Haute, Ind., is building 150 box and 100 flat cars for the Minneapolis & Pacific road.

Bridge Notes.

The Wrought Iron Bridge Co. in Canton, O., has recently taken several contracts for iron highway bridges in Pennsylvania and New York.

The Penn Bridge Co. in Beaver Falls, Pa., has received the contract for an iron highway bridge at Rockford, Ill., over Fortin Creek.

Manufacturing and Business.

The Martin Anti-fire Heating Co., of Dunkirk, N. Y., is fitting up a passenger train on the Boston & Albany road with the Martin anti-fire heating apparatus.

The Wainwright Manufacturing Co., of New York & Boston, reports an increasing demand for its expansion joint. These joints are giving satisfaction wherever they have been used.

Iron and Steel.

The Pennsylvania Steel Co. made during September in its works at Steelton, Pa., 22,863 tons of Bessemer steel and 2,040 tons of open-hearth steel; a total of 24,903 tons. The output of steel rails was the largest ever made at these works in a month.

Lucinde Furnace, at Norristown, Pa., has gone into blast on spiegeleisen.

Oliphant Furnace, in Fayette County, Pa., was to go into blast this week.

The Valentine Ore Land Association is tearing down its charcoal furnace at Logan, Pa., and will build a large coke furnace on the old site.

The Rail Market.

Steel Rails.—The market is active, with some large sales reported and quotations steady at $34@$35 per ton at Eastern mills. A sale of 10,000 tons of English steel rails is reported for a Texas road; the price is said to be about equivalent to the cost of American rails delivered at Galveston.

Rail Fastenings.—The market is fairly active with quotations steady at 2.40 cents per lb. for spikes in Pittsburgh; 2.75@3.10 for track-bolts, and 1.65@1.75 for splice-bars.

Old Rails.—Old iron rails are in more demand and are quoted at $21.50@$23 per ton at tidewater. Old steel rails are scarce and firm at $22@$24 per ton in Pittsburgh.

The Old Columbia Railroad Bridge.

Mr. W. Hasell Wilson writes to the Philadelphia *Ledger* as follows, correcting some mistakes in the account of the "Old Columbia Railroad Bridge," which was reproduced in our last week's issue:

"I would respectfully ask your attention to some inaccuracies in the description of the old Columbia Railroad published in your supplement of the 15th inst. In locating the railroad, 30 ft. per mile was fixed upon as the maximum gradient; this fact determined the necessity for an inclined plane. The conflict between the city proper and the adjoining districts had nothing to do with the adoption of the inclined plane, but was confined entirely to the location from the foot of the plane into the city. To prove the impracticability of any route from the vicinity of the Wayne Tavern within the prescribed limits of grade, it is only necessary to state that the average grade of the present Pennsylvania Railroad from Bryn-Mawr to the city is about 48 ft. per mile. The Schuylkill bridge was designed by Major John Wilson, Chief Engineer, and the construction was superintended by W. Hasell Wilson, Principal Assistant Engineer, and Frederick Erdman, Bridge Inspector. Mr. John C. Trautwine was Assistant Engineer in charge of graduation and tracklaying, and had nothing whatever to do with either the planning or construction of the bridge."

Electric Train Signals.

The through passenger trains of the Connecticut & Passumpsic Rivers road are being equipped with the Judkins electric railroad signal, which is coming into extensive use in New England.

The Raub Central Power Locomotive.

The Raub central power engine, which has had a number of improvements made to it, has been loaded on a flat car and stands in front of the Grant Works ready for shipment to St. Louis, where it is said a company has been formed with a view to building works and entering into the manufacture of the central power engines. Dr. Raub, the inventor, claims that the machine is a success and that its work has far exceeded his most sanguine expectations.—*Paterson (N. J.) Press, Oct. 8.*

Blast Furnaces of the United States.

The *American Manufacturer* (Pittsburgh) of Oct. 9 says: "The report of the condition of the blast furnaces of the United States on Oct. 1 shows that there has been but little change since our last report, Sept. 1.

"In a condensed form the table makes the following showing:

Fuel.	In blast.—No.	In blast.—Weekly capacity.	Out of blast.—No	Out of blast.—Weekly capacity.
Charcoal	63	14,276	113	12,475
Anthracite	118	33,476	85	19,928
Bituminous	131	74,122	75	29,653
Total	312	121,874	273	62,056

"In this connection it is to be noted that we have taken occasion of the biennial publication of Mr. Swank's *Directory* to revise our tables with reference to the existence or non-existence of furnaces. In most cases we have followed Mr. Swank and have stricken from our list those furnaces that he includes among 'Abandoned Furnaces' or those that have not recently been in blast. In several instances for what has

RAILROAD EARNINGS IN AUGUST.

Name of Road.	Mileage. 1886.	1885.	Inc.	Dec.	P. c.	Earnings. 1886.	1885.	Inc.	Dec.	P. c.	Earnings per Mile. 1886.	1885.	Inc.	Dec.	P. c.
EASTERN ROADS.						$	$	$	$		$	$	$	$	
Balt. & Potomac	92	92				113,930	102,851	11,079		10.7	1,238	1,118	120		10 7
Boston & Lowell	690	690				473,330	423,108	50 222		11.9	686	6 3	73		11.9
Buff., N.Y. & Ph	663	663				257,734	228,849	28,885		12 4	389	345	44		12.4
Buff., Ro. & Pitts	294	294				136,301	110,084	26,217		23.8	464	374	90		23.8
Camden & Atlan.	79	79				128.7 0	120,559	8,141		6.8	1,629	1,526	103		6.8
Danbury & Nor	37	37				25,995	24 234	1,761		7.3	703	655	48		7.3
Grand Trunk	2,998	2,998				1,397.670	1,153.312	244,358		21.	466	385	81		21.2
Lehigh & H. R	63	63				20.384	17,200	3,184		18.5	324	273	51		18.5
Long Island	354	354				404.798	380 904	23,894		6.3	1.143	1,076	67		6 3
N. Y. C. & H. R.	1,541	993	548		55.2	2.980,974	1,950,194	1,030,780		52.9	1.934	1,964		30	1.5
N. Y. City & No.	54	54				48,267	39,390	8.877		22.7	894	729	165		22.7
N. Y., L. E. & W.	1,075	1,075				1.659,119	1,437,348	221,771		15 4	1.619	1,402	217		15 4
N. Y. & N. Eng.	392	392				379.543	327.247	52.296		16.0	968	835	133		16 0
N. Y., Ont. & W.	321	321				144.328	128.332	15,996		12.5	450	40 0	50		12.5
N. Y., Sus. & W.	153	150	3		2.0	94.846	101.353		6.507	6.4	620	676		56	8.3
Northern Cen.	322	322				502.027	431.370	50.657		11 2	1,559	1,402	157		11.2
Pennsylvania	2.340	2,268	72		3.1	4,885,301	3,956,306	629,085		16.0	1.958	1,744	214		12 3
Phila. & Reading	1,560	1,560				2,808 308	2,940,749		132,481	4 5	1 800	1.885		85	4 5
West Jersey	200	200				217,918	212,639	5,279		2.5	1.090	1,062	28		2.5
Total, 19 roads	13,2 .8	12,605	623			16,379 523	14.10.6,029	2,412,482	138,988		1,238	1,119	119		
Total inc or dec			623		4 9			2,273,494		16.1			119		10.7
SOUTHERN ROADS.															
Ala. Great So.	290	290				97 756	77.352	20,404		26 5	337	267	70		26 5
Cape F. & Y. V.	155	155				20,248	17,152	3,096		18.0	131	111	20		18 2
Cin., N. O. & T P	336	336				245,739	238,185	7.554		3.2	731	709	22		3 2
Cin. S. & Mobile.	71	71				7,567	6,676	891		13 3	107	94	13		13 3
E. Ten., V. & G.	1.100	1,100				347,293	318,506	28 787		9 0	316	290	26		9.0
Ill. Cen., So. Div.	711	711				272 792	264,753	7 999		3.0	384	372	12		3.0
Louis. & Nash.	2,015	2.015				1,200,567	1,078.796	121,771		11.2	596	535	61		11 2
Louis., N. O. & T.	533	533				118,40	79,638	38 766		48.5	222	149	73		48.5
Mem. & Charles	292	292				119.375	95,824	23,551		24 5	409	328	81		24.5
Mobile & Ohio.	680	680				143,372	149.07?		6,000	4.0	210	219		9	4.0
N., Chat. & St. L	580	580				224,487	182.115	42,372		23.3	387	314	73		23 3
N. O & North E.	195	195				39,916	36,710	2,606		7.0	205	188	14		7.0
N.N.& M. Vy.Co.:															
Ches. & Ohio	502	502				410,966	289.198	111,768		37.3	819	596	223		37.3
E., Lex & B. S.	130	130				91.028	62 9.2	28,096		44.6	700	484	216		44.6
C. Ohio & S. W.	399	399				147.599	136,721	10,678		7.8	369	343	26		7.8
Norfolk & West.	510	510				2-7.407	250.106	37,201		15.0	564	491	73		15.0
Rich. & Danville:															
R. & Dan. Div.	960	960				324,0 0	322,961	1 039		0.3	337	336	1		0.3
Va. Midland D	355	355				149.427	144.753	4,674		3.2	421	408	13		3.2
W. N. C. Div.	290	276	14		5.1	52,034	4 3 821	5,213		11.1	179	169	10		5.9
So. Car. Div.	373	373				5t,771	56,259		5 488	9 8	136	151		15	9.8
Gr. & Col. Div.	296	296				34,5 0	41,327		6,731	16.5	117	140		23	16.3
Shenandoah Val.	255	255				80,367	69 820	10 547		15.1	315	274	41		15.1
South Carolina.	246	246				76,525	73 693	2,832		3.8	311	299	12		4.0
Vicks. & Merid'n	143	143				37,714	34,650	3,064		8.8	264	243	21		8.8
Total, 24 ro ds	11.417	11,403	14			4,578 850	4,034,150	512,919	18,219		401	358	43		
Total inc or dec.			14		0.1			494,700		12 1			43		12.0
CENTRAL GROUP.															
Cairo, V. & Chi.	265	265				60,752	42,025	18,72		44 6	229	159	70		44 6
Chi. & Atlantic.	269	269				141,061	98,980	42,081		42 5	524	368	156		42 5
Chi & East. Ill.	252	252				165,968	146 736	19,232		13.1	659	582	77		13.1
Chi. & W. Mich.	413	413				117,945	113,579	4,366		3.8	285	275	10		3.8
C., I., St. L. & C.	342	342				236,856	206 850	30 006		14 5	693	605	88		14.5
Cin., Jack. & M.	98	91	7		77	16,611	14,377	2 234		15.5	170	158	12		7.5
C., Wash. & Balt.	281	281				183,373	140,412	42,961		30.6	653	500	153		30 6
Clev., Ak. & Col.	144	144				55, 52	47.670	7.482		15 7	383	33	52		15.7
Cleve. & Canton.	161	161				35,229	24,434	11 795		51.0	219	146	73		51.0
Col & Cin. Mid.	71	71				29,635	13,964	15,671		111.9	417	197	220		111 9
Col., H. V. & T.	328	324	4		1.2	226,161	218,006	8,155		3.7	689	673	26		3 7
Det., Lan. & No.	261	261				106,640	110,199		3,559	3.3	408	422		14	3.3
Ev. & T. Haute.	146	146				76,517	74,530	1,987		2.6	538	525	13		2 6
Flint & Pere M.	362	3.2				107,198	155,697	11 501		8.0	462	430	32		8.0
G. R. & Ind.	404	404				201,439	178,756	2 2 933		12.8	49	442	57		12.8
Ill. Cen., Ill. lines	953	953				641,778	576 099	65,679		11.4	673	60	69		11.4
Ind., Bl. & West.	532	532				277,522	242,801	14,721		6.1	484	456	28		6.1
Ind., Dec. & Sp.	152	152				48,871	45,613	3,258		7.1	322	300	22		7.1
Lake Erie & W.	387	387				135,148	101,458	33,690		33.3	349	262	87		33.3
L., Ev. & St. L.	253	253				82,508	63,284	19,224		30.4	326	250	76		30.4
L., N. A. & Chi.	477	477				182,623	157.728	24 895		15.8	383	331	52		15.8
Mich. & Ohio.	153	153				19,335	18,845	490		2.6	124	121	3		2.6
N. Y., Penn. & O.	587	587				557,317	441 338	115,979		26 3	949	752	197		26.3
Ohio & Mississip.	615	615				378,099	334,312	43,787		13.1	615	544	71		13.1
Ohio Southern	130	130				46 354	39 042	7,312		18.7	357	300	57		19.0
Peoria, Dec. & Ev.	254	254				88,566	81,015	7,551		9.3	349	319	30		9.3
Scioto Valley.	131	131				68 608	47,486	21.122		44.5	524	362	162		44.5
St. L. Al. & T. H.:															
Main line	195	195				113,754	126,170		12,416	9.8	583	647		64	9.8
Belleville line.	138	138				62.893	60,007	2 886		4.8	456	435	21		4.8
T., A. A. & N. M.	100	100				33,118	24,675	8,43		34.2	331	247	84		34.2
Wab., St L. & P.	2 140	2,140				1,220,161	1,039,144	181,017		17.4	570	486	84		17.4
Total, 31 roads	10,997	10,986	11			5,757,192	4,984,004	789.163	15,975		524	45.	70		
Total inc. or dec.			11		0 4			773,188		15.6			70		15.4
NORTHWESTERN ROADS.															
Bur., Ced R & No.	990	990				246,435	225,824	20,611		9.1	249	228	21		9.1
Central Iowa	521	500	21		4.2	115,695	113 565	1,530		1.3	221	227		6	2.7
Chi. & Alton.	850	850				735,862	726.005	9.857		1.3	866	854	12		1.3
Chi., Bur. & Q.	3.080	3,467	213		6.2	2,748,175	2,224,303	523 872		23.5	747	642	105		16.4
Chi., Mil. & St P.	4.9.2	4,864	68		1.4	1,973,000	1,786,911	206,089		11.7	400	363	37		10.2
Chi. & Northw.	4,055	3,840	215		5.6	2,299 900	1,922.235	377.665		19.6	567	501	66		13.2
C., St. P., M. & O	1,343	1,320	23		1.7	496 000	476,229	19,771		4.1	369	361	9		2 5
Des M. & Ft. D.	148	148				30,007	27.784	2,223		8 0	2 0	194	16		8.0
Ill. Cen., Ia. lines	402	402				152.975	126,349	32 626		27.2	381	299	82		27.2
Mar., H. & Ont.	160	160				141 799	118,007	23 792		20.	886	738	148		20.1
Mil., L. S. & W.	533	520	13		2.5	250,094	131,221	116,173		86.7	470	258	212		82.2
Mil. & Northern.	227	227				53,229	42 668	10,561		24.8	234	188	46		24.8
Wiscon in Cen.	450	450				113,889	107,365	6 524		6 1	253	239	14		6.1
Total, 13 roads	18,286	17,733	553			9,356 700	8,005 463	1,351 294			512	451	61		
Total inc. or dec.			553		3.1			351.294		16.9			61		13.6
ROADS NORTHWEST OF ST. PAUL.															
Canadian Pac.	4,166	3,064	1,102		35.6	922,133	823,427	98,706		11.9	221	269		48	17.8
Northern Pac.	2,778	2,691	87		3.2	1,226,358	971,289	255,069		26.3	441	361	80		22.3
St. P. & Duluth.	225	225				144,493	128 526	15,967		12.4	642	571	71		12.4
St. P., Minn. & M	1.509	1,185	24		1 6	626 917	525,009	101.908		19.4	415	354	61		17 3
Total, 4 roads.	8,678	7,435	1,213			2,919,901	2,448,251	471,650			33	3 8	8		
Total inc. or dec.			1,213		16.2			471.65		19.3			8		2 4
SOUTHWESTERN ROADS.															
Fort W. & Den.	144	144				37,599	43,648		6,049	13.3	261	303		42	13.3
G., C. & S. Fe.	692	536	156		29.1	158,703	130,963	27.740		18 4	258	282		24	8.6
H. & Tex. Cent.	521	521				246,728	240,467	6,261		2.6	474	462	12		2.6
K. C., Ft S. & G.	389	389				199.0 7	179,934	19 163		10.6	512	462	50		10 6
K. C., S. & Mem.	282	282				130,349	94,881	35,468		37.3	462	336	126		37.3
L. R. & Ft S.	170	170				51,937	39,711	12 2 6		30.8	305	233	72		30.8
L. R., M. R. & T	170	170				27,822	20,342	7,480		36.9	164	120	44		36.9
St. L., Ark. & Tex	735	735				149,671	103,954	45,717		44.0	203	141	62		44.0
St. L. & San F.	870	814	56		6.7	455,785	368,445	87.340		23.7	524	453	71		15.6
V., Shreve. & Pa.	170	170				37,883	32,297	5.586		17.4	223	190	33		17.4
Total, 10 roads	4,143	3,931	212			1,515,574	1.274,642	246.981	6,049						
Total inc or dec.			212		5.4			240,932		18.9					
FAR WESTERN AND PACIFIC ROADS.															
A., T & S. Fe.	2,418	2,393	25		1.0	1 341,951	1,243,908	98 043		8.0	555	520	35		6.8
Den. & Rio G.	1.3 7	1,317				614 690	562,734	51,956		9.2	467	427	40		9.2
Den. & Rio G. W.	368	368				2 9 3 0	91,3 3		1.983	2.1	243	248		5	2.1
St. J. & G. Isl'd.	252	252				105,667	89,672	15,995		17.7	419	356	63		17.7
Texas & Pacific.	1,487	1,487				43 0,020	501,890		71,870	15 4	289	338		49	14 4
Union Pacific.	4,560	4 499	61		1.3	2,587,741	2,320,621	267.119		11.5	567	516	51		10.0
Total, 6 roads.	10,402	10,316	86			5,169,409	4 810,138	433,104	73,833		497	466	31		
Total inc. or dec.			86		0.8			359,271		7.5			31		6.7
GRAND TOTAL:															
Total, 107 roads	77,151	74,439	2,712			45,677,209	39,712,680	6,217.503	253,064		592	533	59		
Total inc. or dec.			2,712		3.7			5,964,529		15.0			59		11.1

RAILROAD EARNINGS, EIGHTI MONTHS TO AUGUST 31.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1886.	1885.	Inc.	Dec	P. c.	1886.	1885.	Increase.	Decrease.	P. c.	1886	1885	Inc.	Dec.	P. c.
EASTERN ROADS															
Balt. & Potomac.	92	92	.....	.. ..	.....	$ 856,566	$ 862 198	$	$ 5,632	0.6	$ 9,311	$ 9,372	$	$ 6	0.6
Buf., N. Y. & P..	663	6 3	.....	.....	.....	1,704,079	1,521,608	182.471	.....	12.0	2,570	2,295	275	.....	12.0
Buf., Roch. & P.	294	294	.....	.....	.....	758,821	771,305	.....	12.484	1.6	2 581	2.623	.....	42	1.6
Cam. & Atlantic.	79	79	.....	.....	.....	440,959	412.835	28,124	.....	6.8	5,582	5,226	356	.....	6.8
Dan. & Norwalk.	37	37	.....	.....	.....	150.935	143,782	7,153	.....	4 9	4.079	3.886	193	.....	4.9
Grand Trunk ...	2,998	2.985	13	.....	0.4	10,516,519	9,395,126	1,121,393	.....	11.5	3 508	3 147	361	.....	11.5
Lehigh & H. R. .	63	63	.....	.....	.....	138 373	111,272	27,101	.....	24.4	2,196	1,706	420	.....	24 4
Long Island	354	354	.....	.....	.....	2,022,940	1 923,428	99,512	.....	5.4	5,714	5,433	281	.....	5.4
N. Y. C. & H. R.	1,541	993	548	.....	55.2	20.571.211	15,181,605	5,389,606	.....	35.5	13,349	15 289	.....	1.940	12 7
N. Y. City & N.	54	54	.....	.....	.....	352,793	279.421	73 372	.....	26.2	6,534	5,174	1,359	.....	26.2
N.Y., L. E. & W.	1,075	1,075	.....	.....	.....	11,779 085	9.839.681	1,939,404	.....	19 7	10.957	9.153	1.804	.....	19.7
N. Y. & N. Eng..	392	392	.....	.....	.....	2,517,190	2,137 129	380.061	.....	17 8	8.621	7.319	1.302	.....	17 8
N. Y., Ont. & W.	321	321	.....	.....	.....	861.806	809 532	52,244	.....	6.4	2,685	2 513	172	.....	6 4
N. Y., Sus. & W.	153	150	3	.....	2.0	696.475	698,165	.....	1.690	0 2	4.552	4.654	.....	102	2.2
Northern Cen.	322	322	.....	.....	.....	3,533,889	3,460,865	73,024	.....	2.1	10,975	10,748	227	.....	2.1
Penn. R. R.....	2,329	2,268	61	.....	2.7	32 192 231	28,961.014	3 231,227	.....	11.2	13,822	12,769	1,0 3	.....	8.3
Phila. & Read....	1,560	1,560	.....	.....	.....	18,992,.52	18,292,802	699.450	.....	3.8	12,175	11.726	449	.....	3 8
West Jersey.....	200	200	.....	.....	.....	913,414	892,937	50.477	.....	5.6	4,717	4 462	255	.....	5.6
Total, 18 roads.	12,527	11,902	625	.....	.....	109,729,538	95,694,725	13 354,619	19,806	.....	8 704	8,040	664	.....	.....
Tot. inc. or dec.	.....	.....	625	.....	5.2	.....	.....	13,334.813	.....	13.9	.....	.....	664	.....	8.3
SOUTHERN ROADS.															
Ala. Gt South..	290	290	.....	.....	.....	725,294	667,054	58,240	.....	8.7	2.501	2.300	201	.....	8.7
Cape F. & Y. V..	155	155	.....	.....	.....	139.665	129 020	10,645	.....	8.2	901	832	69	.....	8 2
Cin., N. O. & T. P	336	3'6	.....	.....	.....	1.782,961	1,668,773	114.188	.....	6.8	5 306	4,967	339	.....	6.8
E. T., Va. & Ga..	1.100	1 100	.....	.....	.....	2.559,124	2..19,545	39,579	.....	1.6	2,3.6	2.290	36	.....	1.6
Ill. Cen., S. Div.	711	711	.....	.....	.....	2,323,956	2,611.743	.....	287.787	11.0	3,268	3.673	.....	405	11.0
Louis. & Nash...	2,015	2 040	.....	25	1.2	8.790,269	8.970,083	.....	180,777	2 0	4.362	4 498	.....	36	0 8
Louis., N. O. & T	533	494	39	.....	7.8	960.445	781 239	179,206	.....	29.9	1.802	1 581	221	.....	13 8
Mem. & Charles.	292	292	.....	.....	.....	809.844	790,964	18.880	.....	2.4	2.773	2.709	64	.....	2.4
Mobile & Ohio ..	565	565	.....	.....	.....	1.137 681	1.196.295	.....	58,614	5 0	2,013	2.117	.....	104	5 0
Nash., C. & St. L	580	580	.....	.....	.....	1,520 545	1,275,001	145,544	.....	10.6	2.622	2,371	251	.....	10 6
N. Or. & N. E....	195	195	.....	.....	.....	376,225	415,632	.....	39,407	9.5	1,929	2,131	.....	202	9.5
N. N. & M.V. Co.:															
Ches. & Ohio..	502	502	.....	.....	.....	2,636 293	2,145,826	490,467	.....	22.9	5,252	4,274	978	.....	22 9
Eliz. L. & B. S.	130	130	.....	.....	.....	580,349	436,990	143,359	.....	32.8	4,464	3.361	1,103	.....	32.8
C., O. & S. W..	399	399	.....	.....	.....	1,025.086	970.024	55,062	.....	5.7	2.569	2.431	138	.....	5.7
Nor. & West.....	510	510	.....	.....	.....	1,993,074	1,697,701	295,373	.....	17.0	3,908	3,329	579	.....	17 0
Rich. & Danville:															
Rich. & D. Div.	960	960	.....	.....	.....	2,484,699	2 450.511	33,888	.....	1 4	2,588	2,553	35	.....	1 4
Vir. Mid. Div..	355	355	.....	.....	.....	960.956	971,775	.....	10,819	1.1	2,707	2,737	.....	30	1 1
West. N. C. Div.	290	276	14	.....	5.1	333,928	299,380	34,548	.....	11.5	1,152	1.089	63	.....	5.8
So. Car. Div. ..	373	373	.....	.....	.....	474,279	481.265	.....	6,986	1.4	1.272	1,290	.....	18	1 4
Green. & C. Div	296	296	.....	.....	.....	368,925	390,761	.....	21,836	5.6	1.246	1.320	.....	74	5.6
S en. Valley.....	255	255	.....	.....	.....	448,111	435.812	12.299	.....	2.8	1,757	1,709	48	.....	2.8
So. Carolina. ...	246	246	.....	.....	.....	672,320	667.822	4,498	.....	0.7	2,733	2,715	18	.....	0 7
Vick. & Meridian.	143	143	.....	.....	.....	367.056	262,345	44.711	.....	17.1	2.147	1.834	313	.....	17.1
Total, 23 roads.	11,231	11,203	53	25	.....	33 411,025	32,336,764	1,680.487	606,226	.....	2,975	2,886	89	.....	.....
Tot. inc. or dec.	.....	.....	28	.....	0.3	.....	.....	1,074,261	.....	3 3	.....	.....	89	.....	3.1
CENTRAL GROUP.															
Chi. & East. Ill..	252	252	.....	.....	.....	1,089,474	1,003.191	86,283	.....	8.6	4,323	3,981	342	.....	8.6
Chi. & West M..	413	413	.....	.....	.....	892.743	829.334	63,409	.....	7 6	2,162	2 008	154	.....	7.6
C., L., St. L. & Ch	342	342	.....	.....	.....	1.651.324	1,533,561	118,093	.....	7 7	4,829	4.484	345	.....	7.7
C., Wash. & Balt.	281	281	.....	.....	.....	1,246,009	1.094,991	151,018	.....	13.8	4,434	3,897	537	.....	13.8
Cleve., Ak. & Col	144	144	.....	.....	.....	343,023	323,261	19 762	.....	6 1	2,382	2.245	137	.....	6.1
Clev. & Canton .	161	161	.....	.....	.....	228,640	190 305	38,335	.....	20 2	1.420	1.182	238	.....	20 2
Col. & Cin. Mid..	71	71	.....	.....	.....	198.407	116,852	81,555	.....	69.7	2,794	1.646	1,148	.....	69.7
Col., H. V. & Tol	328	324	4	.....	1.2	1.469.033	1,475,272	.....	6,239	0.4	4,479	4,553	.....	74	1.6
Det., Lans. & No	261	261	.....	.....	.....	782.916	757,638	25,278	.....	3 3	3.000	2,903	97	.....	3.3
Ev. & Terre H. ..	146	146	.....	.....	.....	498,676	470,203	28 473	.....	6 0	3.416	3 221	195	.....	6.0
Flint & Pere Mar	362	362	.....	.....	.....	1 419.194	1,242,887	176,307	.....	14.2	3 920	3.433	487	.....	14.2
Grand Rap. & In.	404	404	.....	.....	.....	1,294.639	1,215,326	79,313	.....	6.5	3,205	5,008	197	.....	6.5
Ill. Cent., Ill. lines	953	953	.....	.....	.....	4.118,845	4,088,387	30,458	.....	0.7	4,322	4,290	32	.....	0 7
Ind., Bloom. & W	532	532	.....	.....	.....	1,606 760	1,471,688	135.072	.....	9.2	3.020	2,766	254	.....	9.2
Ind., D. & Spring	152	152	.....	.....	.....	268 573	229,715	41.855	.....	18.5	1.767	1.492	275	.....	18.5
Lake Erie & W..	387	387	.....	.....	.....	816,404	756,844	59,620	.....	7 8	2,110	1,956	154	.....	7 8
Louis., E. & St. L	253	253	.....	.....	.....	540.470	450,908	89,568	.....	19 9	2,136	1,782	354	.....	19.9
L., N. A. & Chi..	477	477	.....	.....	.....	1,197.356	1,032,995	164,355	.....	15.9	2,510	2,166	344	.....	15.9
Mich. & Ohio ...	156	156	.....	.....	.....	139,887	110,816	29,071	.....	26.2	897	710	187	.....	26.2
N. Y., Penn. & O	587	587	.....	.....	.....	3.972,668	3,114,184	858,482	.....	27.6	6.768	5.305	1,462	.....	27.6
Ohio & Miss.	615	615	.....	.....	.....	2,444.249	2,354,526	89,723	.....	3.8	3,974	3,826	146	.....	3.8
Ohio Southern..	130	130	.....	.....	.....	307 843	235,872	41,971	.....	15.8	2,368	2.045	323	.....	15.8
Peoria, D. & E...	254	254	.....	.....	.....	497,925	463,303	34.622	.....	7.5	1,960	1,824	136	.....	7.5
St. L., Al. & T. H:															
Main line	195	195	.....	.....	.....	784 368	786,947	.....	2,579	0.3	4.022	4.035	.....	13	0.3
Belleville line..	138	138	.....	.....	.....	450,188	462,611	.....	12.425	2.7	3,262	3,352	.....	90	2.7
Wab., St. L. & P.	2,220	2,220	.....	.....	.....	8,119,480	7,371.400	748,080	.....	10.1	3,657	3,320	337	.....	10.1
Total, 26 roads	10,214	10,210	4	.....	.....	36,379,447	33,210,117	3,190,573	21,243	.....	3,562	3,253	3 9	.....	.....
Tot. inc. or dec	.....	.....	4	.....	.....	.....	.....	3,169,330	.....	9 5	.....	.....	309	.....	9.5
NORTHWESTERN ROADS.															
Bur., C. Rap & N.	990	990	.....	.....	.....	1,721,803	1,864,123	.....	142 320	7.6	1,739	1 883	.....	144	7.6
Central Iowa....	521	500	21	.....	4.2	808,727	765,948	42,779	.....	5.6	1,552	1,532	20	.....	1.3
Chi & Alton	850	850	.....	.....	.....	4,972 994	5,053,344	.....	60,3 0	1.2	5,851	5,922	.....	71	1.2
Chi., Bur. & Qui.	3 660	3,467	193	.....	7.7	16,602.275	16,410,.05	197,170	.....	1.2	4,536	4,733	.....	197	4.2
Chi., Mil. & St. P	4,928	4,812	116	.....	2 4	14,648.000	14.272,845	375,155	.....	2 6	2.972	2,968	6	.....	0.2
Chi. & No. West.	3,984	3,835	149	.....	3 9	15.225.932	14,639,327	586,665	.....	4.0	3,822	3.817	5	.....	0.1
Ch., St.P., M. & O.	1,340	1,320	20	.....	1 5	3,682,024	3,459,623	222,401	.....	6 5	2,748	2,621	127	.....	4 9
Des M. & Ft. Do.	143	113	.....	.....	.....	263,760	226,395	.....	22,635	10.0	1 425	1,583	.....	158	10.0
Ill. Cen., Ia. lines	402	402	.....	.....	.....	1,050,754	1,004 180	46,574	.....	4 6	2,614	2 498	116	.....	4 6
Marq., H. & O....	160	151	9	.....	6 0	656,551	523 554	132,997	.....	25 4	4 103	3,467	636	.....	18.2
Mil., Lake S. & W	533	496	37	.....	7.4	1,441,607	816,146	625,461	.....	76.5	2,705	1,655	1,050	.....	64.4
Mil. & Northern.	227	227	.....	.....	.....	397.741	365,453	34,288	.....	9 5	1 752	1,601	151	.....	9 5
Wisconsin Cent.	4 0	4 0	.....	.....	.....	908.546	942.182	.....	33,636	3.6	2,019	2,094	.....	75	3 6
Total, 13 roads	18.188	17 643	545	.....	.....	62,320,774	60,321,225	2 258 490	258 941	.....	3 426	3,419	7	.....	.....
Tot. inc. or dec	.....	.....	545	.....	3.0	.....	.....	1,999,549	.....	3.3	.....	.....	7	.....	0.2
ROADS NORTHWEST OF ST. PAUL.															
Canadian Pacific	3,607	3,030	577	.....	19.1	8,080.824	5,06 .465	1,018 359	.....	20.1	1,686	1,671	15	.....	0 9
Northern Pacific	2,760	2.507	253	.....	10.1	7,314,639	6,577,731	736,908	.....	11.2	2,650	2,624	26	.....	1 0
St. P. & Duluth.	225	225	.....	.....	.....	845,336	744.564	100,772	.....	13.5	3,757	3.309	448	.....	13.5
St. P., Min. & Man	1,488	1,475	13	.....	0.9	4,131.797	4.922,314	.....	90.517	2.1	2,777	2,863	.....	86	2 9
Total, 4 roads..	8,080	7,237	843	.....	.....	18,372,596	16.607,074	1,856,039	90,517	.....	2,274	2,295	.....	21	.....
Tot. inc. or dec	.....	.....	843	.....	11.7	.....	.....	1,765,522	.....	10 6	.....	.....	.....	21	0.9
SOUTHWESTERN ROADS.															
Ft W. & Denv..	144	127	17	.....	13 4	242.636	303,282	.....	60.646	19.6	1,683	2,388	.....	705	29 4
Gulf, Col. & S. F.	647	536	111	.....	20.7	1,282.022	889,697	392,325	.....	44.1	1 981	1,660	321	.....	19.4
Hous. & T. Cent	521	521	.....	.....	.....	1,538,301	1,234,161	304,140	.....	24.6	2 953	2,369	584	.....	24.6
K. C., Ft. S. & G.	389	389	.....	.....	.....	1,576,951	1.629.305	.....	52,354	3.2	4 054	4,188	.....	134	3.2
Kan. C., Spr. & M.	282	282	.....	.....	.....	939,862	1.022.163	.....	82,301	8.1	3.333	3.625	.....	292	8.1
Little R. & Ft. S.	170	170	.....	.....	.....	370,634	321,388	49,246	.....	15.3	2,180	1,890	290	.....	15.3
L. R., M. R. & T.	170	170	.....	.....	.....	214,880	185,269	29,611	.....	16 0	1 264	1,090	174	.....	16.0
St. L., A. & Tex.	735	735	.....	.....	.....	1,014,286	629,706	384,580	.....	61.0	1.380	857	523	.....	61 0
St. L. & San Fran	857	814	43	.....	5.2	2,893,485	2,071.371	221.814	.....	8 3	3,376	3,282	94	.....	2.8
Vicks., Sh. & Pac	170	170	.....	.....	.....	267.585	219.103	48,482	.....	22.1	1.574	1.289	285	.....	22 1
Total, 10 roads	4,085	3,914	171	.....	.....	10 340,342	9,105,445	1,430,198	195,301	.....	2,521	2,326	205	.....	.....
Tot. inc. or dec.	.....	.....	171	.....	4 4	.....	.....	1,234 897	.....	13 6	.....	.....	205	.....	8.8
FAR WESTERN AND PACIFIC ROADS.															
At., Top. & S. F.	2,416	2,377	39	.....	1.6	9 586.429	9,652.949	.....	66.520	0 7	3,968	4,061	.....	93	2.3
Denver & R. G..	1,317	1,317	.....	.....	.....	4.107.536	3,846.835	260.701	.....	6 7	3.119	2.921	198	.....	6.7
Denv. & R. G. W.	368	368	.....	.....	.....	642.631	616.451	26.180	.....	4.2	1,746	1,675	71	.....	4.2
St. Jo. & Gr. Isl'd	252	252	.....	.....	.....	733 323	658,851	74.472	.....	11.3	2,910	2,615	295	.....	11.3
Tex. & Pacific...	1,487	1,487	.....	.....	.....	3,384,451	3,103,598	280,853	.....	9.1	2,276	2,087	189	.....	9.1
Union Pacific ...	4,533	4,499	34	.....	0.8	16,557.112	15,774.488	782,624	.....	5.0	3,653	3,506	147	.....	4.2
Total, 6 roads.	10,373	10,300	73	.....	.....	35,011,482	33,653,172	1,424.830	66.520	.....	3,382	3,267	115	..	.....
Tot. inc. or dec.	.....	.....	73	.....	0.7	.....	.....	1,358,310	.....	4.0	.....	.....	115	.....	3.5
GRAND TOTAL:															
Total, 100 roads.	74,698	72,409	2,314	25	..	304,865,204	280,928 522	25,195 236	1.258,554	.....	4,081	3,877	204	.....	.....
Total inc. or dec.	..	.....	2,289	.....	3.2	.....	.....	23,936.682	.....	8 5	.....	.....	204	.....	5 3

seemed to us sufficient reasons we have stricken out of the list furnaces that Mr. Swank has retained in his *Directory* as active furnaces and have included in our list some that he has excluded. This revision affects, however, so far as these reports are concerned, the columns 'Out of blast.'

"A comparison of the report for October with that for September shows but little change, and that little in harmony with the usual change at this period of the year. There are 3 less charcoal furnaces in blast, but the 63 furnaces blowing have a weekly capacity of 3,171 tons greater than the 66 blowing a month ago. There are 3 less anthracite furnaces blowing, with, however, but 615 tons less weekly capacity. There is 1 less bituminous furnace in blast, but the reduction in capacity is 2,148 tons. It will be noted that the change in capacities is not in the same ratio as the change in number of furnaces. The reason of this is evident. More furnaces blow out or blow in than the number given. For example, there may be a change in the condition of 12 or 15 furnaces, but the balance of changes will show a difference of but 3 or 4.

"As compared with one year ago the increase in production has been very great, as will be seen from the following comparative table:

Fuel.	—Oct. 1, 1885.— No.	Weekly capacity.	—Oct. 1, 1886.— No.	Weekly capacity
Charcoal.....	62	2,056	63	14,276
Anthracite.....	75	20,318	118	33,476
Bituminous	88	43,234	131	74,122
Total..	225	71,608	312	121,874

"Using round numbers, the production of charcoal iron is 75 per cent. greater Oct. 1, 1886, than it was a year ago; of anthracite, 64 per cent. greater, and of bituminous, 72 per cent. greater."

The *American Manufacturer* estimates the total production of pig-iron in the United States for the nine months to Sept. 30 as follows: Charcoal, 301,937; anthracite, 1,412,840; bituminous, 2,447,120; total, 4,161,907 tons.

Wrought Iron Mitis Castings.

The *American Machinist* describes the appearance of a remarkably good specimen of what can be done by this promising process.

The letter accompanying the casting thus humorously describes it:

"The article was designed for a 'beefsteak pounder,' but it can be applied with success to a variety of purposes. Its general appearance will at once suggest its employment as a hair brush, in which service it will doubtless stimulate an extraordinary activity in the brain of the party under treatment. Therefore, paraphrasing the ancient use of the razor-strop man: 'If you have an assistant remarkably dull, just rub this brush upon his skull.' If this does not answer, reverse the implement and make a vigorous percussive application to the (in reversed) most obtrusive part of his person. This, I am sure, will convince the most obdurate mind that might is (Mitis) right, and that such 'reverses' are favorable neither in the breach nor in the observance."

To this the *American Machinist* adds:

"The base of the casting is a rectangular plate 3 by 4 in. by ¼ in. thick, with a handle. From this plate project 96 parts, one inch long by about ¼ in. by ⅛ in. In casting it was necessary to vent these projecting parts, for which purpose a vent rod, apparently of about ⅛ in. diameter, was used, through about ⅜ in. of sand. Now, one of the peculiarities of this casting is that the metal not only filled the projecting parts, but flowed up and filled the holes in the sand, left by the vent wire. We have no doubt that this peculiar condition is what suggests to Mr. Durfee that it would make a good hair brush. It certainly shows a most remarkable fluidity of metal. We may remark, as emphasizing this, that while these projections of metal in the holes left by the vent-rod show a strong resistance to bending, they will yet bend double without breaking."

A Tell Tale Paint.

Mr. Henry Crookes, of London, Eng., has invented a tell-tale paint, for showing when a bearing is growing hot. At normal temperatures it is a brilliant red, but as it is heated it grows darker until at 180 degrees Fahr., it is quite brown. As it cools it regains its original color. If the bearings of an engine or machine be covered with paint the man in charge can tell at a glance if they are running cool, and if they become hot, he can watch from a distance the effect of the lubricant he applies.

Steel for Boiler Plates.

The *Locomotive*, published by the Hartford Steam Boiler Insurance Co., says in its last issue: "The discussion of the question, 'Is steel a suitable material for steam boilers?' is still carried on by parties who ought to have settled it to their satisfaction long before this. The great stumbling-block seems to be the idea that anything bearing the name of steel must necessarily have all the characteristics of ordinary tool steel. For the kind of metal used for boiler-plates, and all kindred purposes, at the present day, the name of steel is apt to be misleading, but it has been applied and used for such a length of time that it will probably stick. This is, however, a question of no consequence whatever, as long as the material furnished is perfectly adapted to its purpose.

"The steel to which we refer is really a very pure and homogeneous iron—this purity and homogeneity resulting from the scientific method of its manufacture. In view of the extraordinary results following the discovery of the modern method of making homogeneous iron, called steel, the comparative simplicity of the processes, and the saving of labor as compared with the ordinary method of making wrought iron, it seems strange to us that the processes were not discovered hundreds of years ago, instead of but a quarter of a century. It seems a reproach to metallurgists that this is so."

American and English Locomotives.

It would have been impossible to convey in so few words a description of English locomotives which should as accurately describe general features as have sufficed in our brief description of the American engine. In the one item of cylinders alone, while the whole of the American practice is combined in the words—outside, horizontal, with top valve chests, English practice is ranging all over the field, and includes every feasible inclination either up or down, inside or outside, with valve chests anywhere. To pull a train of 150 tons on the Midland Railway requires something very similar but still different from what is required on the Lancashire & Yorkshire or the North British. The Manchester, Sheffield & Lincolnshire again differ in slight particulars. The London & Northwestern and the Great Northern differ again, and for their own traffic will use two different engines for the same train on different days. We have no uniformity in a country wherein no place is 1,000 miles from any other and climate and general contour of country are equal. In America, over a territory vastly greater in distances and variations of climate, no such wide discrepancies of practice appear, and comparatively few classes cover the range of requirements. —*Mechanical World.*

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE TRUNK LINE THROUGH FREIGHT MOVEMENT IN SEPTEMBER.

The through trunk line shipments westward in September naturally were much less this year than last, when the very low rates and the knowledge of an advance in them after September greatly stimulated shipments. These shipments (from New York, Boston, a large number of interior New England points, Philadelphia and Baltimore to Buffalo, Pittsburgh, and other western termini of the Eastern trunk lines, or to points further west) have been, in tons, in September for seven years :

1880.	1881.	1882.	1883.	1884.	1885.	1886.
176,007	233,308	213,469	182,851	187,523	226,272	195,942

Thus the shipments this year were 13½ per cent. less than last year, 8 per cent. less than in 1882, and 16 per cent. less than in 1881, but 4½ per cent. greater than in 1884, and 7 per cent. more than in 1883, not to say 11½ per cent. more than in 1880, when business was extraordinarily good. In all the years when the shipments were larger than this year rates were much lower.

The decrease from last year cannot be charged to larger canal shipments exclusively, for it extends to the shipments of other places and not to those of New York alone. At Boston a decrease of 20 per cent. is reported; at New York, 14¼ ; and at Baltimore, 11 per cent. The Boston shipments are the smallest reported for seven years. The shipments from Philadelphia have been exceeded but once in September, and only slightly then.

The comparisons with years of much lower rates do not indicate fairly the course of trade, though it is certainly true that trade was unusually good last year in September.

For the nine months ending with September the trunk line through shipments westward have been :

Year.	Tons.	Year.	Tons.
1880	1,436,398	1884	1,516,280
1881	1,530,876	1885	1,549,626
1882	1,876,952	1886	1,453,469
1883	1,450,490		

Thus the shipments this year were the smallest since 1880, but the decrease from last year is small considering the higher rates, amounting to 96,159 tons, or 6.2 per cent., and only in 1882 were the shipments very much larger than this year.

There has been some decrease this year compared with last in every month except January, but of the entire 96,000, only 6,000 occurred before April; the decreases were 12,000 tons in May, 19,000 in June, 17,800 in July, 2,700 in August and 30,330 in September. The decrease was large in September because the shipments were extraordinarily large in that month last year. They continued to be large (though not so large) all the rest of the year, and trade may be very good without equaling them this year.

The trunk-line shipments *eastward* in September, which include all received at their western termini and carried to local as well as through points, have been for seven years in tons :

1880.	1881.	1882.	1883.	1884.	1885.	1886.
887,167	956.821	965,310	969,066	918,588	1,083,386	1,095,231

Thus this eastward movement was larger this year than in any previous September. That it should be larger than last year, when a rate of 10 cents on grain and flour from Chicago to New York was common, and not much more was received for any shipments, while probably 22 cents was the lowest received this year, is a very remarkable fact. The shipments reported from Chicago were only half as great as last year, and making the greatest possible allowances for the non-reporting lines there, they must have been 40 per cent. less than last year, and yet this did not prevent an increase in the total trunk-line shipments eastward—another illustration of the insufficiency of the reports of Chicago traffic to enable us to judge of the general course of traffic.

The trunk-line movement east last September has been exceeded but five times in the history of the traffic—in July, October and November of 1880, in August, 1881, and in March, 1885—and but slightly in any of those months.

The shipments last September were only 4 per cent. more than in August, but they were 18 per cent. more than the average monthly shipments this year previous to August.

For the nine months ending with September these east-bound shipments have been :

Year.	Tons.	Year.	Tons.
1880	8,208,994	1884	7,232,086
1881	8 366.787	1885	8,327,299
1882	6,859,932	1886	8,287,907
1883	7,387,808		

Thus the shipments this year were but a trifle less than last year and in 1881, and larger than in any other year. Since April, these east-bound shipments have been larger in every month this year than in any other year since 1881, but for the first four months of this year they were much (14¼ per cent.) less than last year; but this has been made up since, and for the five months ending with September the movement was nearly 12 per cent. more than last year, 16 per cent. more than in 1884, and 20 per cent. more than in any previous year—a notable improvement considering the advance in rates. The earnings of the trunk lines east of Buffalo, Pittsburgh, etc., from this traffic must have been some millions more for the nine months this year than last year, and exceeded only in 1880 and perhaps in 1881, and in September alone they must have been nearly $1,000,000 greater—all net.

GOOD PRACTICE IN BRIDGE-BUYING.

It is difficult to cover properly and fully, within the limits of an editorial, any subject of importance enough to write about at all, and the letter of Mr. Lindenthal, in another column, reveals some points in which we failed to do so, while as to one or two details we are compelled to take issue with his conclusions.

The most important service which can be rendered to the cause of good bridge-building at the present time is to put a final quietus on the indefensible plan of figuring down bridge-strains to fit some one or two or three imaginary locomotives, under the wholly untenable and unscientific assumptions, *first*, that the distribution of strains produced by moving that load statically over the bridge bears any exact or constant ratio to the strains which actually result under the impacts of service ; *secondly*, that these loads will not very probably need to be exceeded, and *thirdly*, that even if they are not exceeded the present practice leaves enough margin of strength for reasonable safety and durability. This reform can only come from bridge-buyers, for it may be taken as quite certain that it will never be very actively urged (although it is not likely to be opposed) by any bridge manufacturers.

When this injurious and improper practice has been wholly done away with by the substiution of the more rational rolling load of not less than 3,500 lbs. per foot, with 50,000 lbs. concentrated load on one axle in addition for proportioning the floor system, then it will not greatly matter whether strain sheets are made out by bidders or by railroad companies, for the reason that it will be a simple matter, involving little trouble and expense, either to make them out or to check them. That on the whole it would be better to invite proposals on a strain sheet issued, as suggested by Mr. Lindenthal, can hardly be doubted. It must never be forgotten that to the American system of bidding on bridges for a lump sum, with its consequent stimulus to ingenuity and skill, we owe the pre-eminent progress of American bridge-building, and that the system could be wholly changed without great injury we do not believe. But the permanent concentration in the same hands of all the functions of design and construction is wrong in principle, and puts too great a premium on sharp practice and plausible incompetence.

That it would be wise to let bridges at a round sum per pound we do not believe. The just medium would seem to be this : Let railroad companies prepare their own strain sheets, through competent bridge engineers engaged for that purpose, if none are already in their service. Let it be distinctly left open to any competitor to substitute an equivalent strain sheet, if varying only in unimportant details of proportion. This will leave the road open for utilizing all those possibilities of economy which bridge-builders are more likely to look sharply after than either bridge-buyers or their engineers.

Let bids, then, be invited on the structure at a lump sum *for a gross weight specified by the bidder, with a certain small allowance for either excess weight or weight in deficit* in the completed structure, not exceeding (or very slightly exceeding) the cost of the raw material.

This will preserve all that is good and do away with all that is bad in present practice, the only further necessity being that bids thus submitted shall be compared intelligently. It removes all temptation to skimp the bridge on the one hand or pile in metal where it does not count on the other, leaving the bridge company free to do all that it can to make the structure better by more material, without profit, but without loss. Every reputable company will then do its very best to make the structure a good one in every detail, for its own reputation.

Had such practice as this been in vogue from the beginning, we should never have heard of the present preposterous fashion of specifying rolling loads, the prevalence of which may be directly traced to these concurring causes, no one of which is such as to commend it to favor:

1. It probably arose originally from that love of hair-splitting and of attempting minute precision where none exists or is needed, which breaks out in many other ways, as notably in frogs and switches and computing earthwork. This is one of the most unfortunate results of a highly mathematical turn of mind in engineers. Mathematics abhors uncertainty and indefiniteness—a fortunate fact in many cases, but when it leads to manufacturing precision where none exists, or tends to whittling down bridges to the precise amount of material which is certainly needed, it is anything but fortunate.

2. It has unquestionably been helped along by a readiness among bridge engineers, especially among those commercially interested in bridge building, to make more of an "art *and mystery*" of bridge designing. The process of computing bridge strains is as essentially mechanical a process, for the run of ordinary structures, as laying up bricks, and can be mastered in much shorter time by any one of engineering training ; but life is short, and the process is very much more complicated and involved if the strains are to be made just right for each separate wheel of some one assumed locomotive than if a simpler and somewhat larger load be assumed. Consequently, few engineers who do not make bridge building a speciality are well informed on the details of the more complicated process, and it always gives a shade of advantage to those with bridges and bridge building knowledge to sell to have the buyer a little less capable of looking out for himself.

3. The most important cause of all, without which so essentially unreasonable and injudicious a system would never have come in vogue, is the commercial advantage it gives to bridge-builders, in that it enables them to give the appearance of all needed strength, without the reality, with the least possible amount of material. To this cause must also be ascribed, in good part, the very vague knowledge which the bridge-buying public have, and their engineers as well, of the trifling effect on the total weight of structures which results from very material increase of strength. The keen anxiety of bridge-builders to know precisely what strength is required in the whole structure and each individual member naturally tends to disseminate an impression that it makes an immense difference. So it does in the profits on the structure, but not in its total cost.

It is a fact not sufficiently realized by bridge-buyers that the present system of inviting designs from perhaps a dozen competitors means, first, that each and all of these designs must be paid for (for the successful competitor must recover for his previous unsuccessful competitions), and secondly, as Mr. Lindenthal well points out, that all risks will be charged for at a heavy percentage. When bidders have to take the

chance of their weights running over somewhat, a habit of adding rather more than enough to cover the risk is certain to grow up among them. While we do not care to be pinned down to precisely these figures, we think it probable that these two luxuries cost the bridge-buying public considerably more than it would to have their bridges proportioned for 20 per cent. greater rolling loads.

As to whether the single track trusses or one double-track truss is to be preferred, we had in mind more the numerous cases in which considerable expense is incurred for double-track structures for the sake of appearance or "to save spreading the tracks," as one specification puts it—a consideration of very trifling importance. The choice depends largely on how much importance is attached to having one's eggs in two baskets instead of one, which seems to us very important. We think likewise that Mr. Lindenthal rather over-states the arguments on the other side which he advances, although they unquestionably have weight.

THE WHEAT MOVEMENT SINCE HARVEST.

The Northwestern wheat receipts since the new crop began to move have been to Oct. 2, 12 weeks:

Year.	Bushels.	Year.	Bushels.
1870	15,549,442	1879	37,955,828
1871	21,759,983	1880	32,174,848
1872	15,881,642	1881	18,925,859
1873	26,857,183	1882	35,005,852
1874	20 64-.949	1883	27,58 2,387
1875	21,104,013	1884	34 052,375
1876	16 211,655	1885	20,553 200
1877	18,302,196	1886	38,249,662
1878	32,518.863		

Thus the receipts at those markets this year, in spite of the fact that last year's crop was one of the poorest on record, and this year's not a large one, have been larger for the twelve weeks since harvest than ever before, though nearly the same as in 1879. Heretofore the receipts have been large only where the harvest was large, but a great deal depends on the quantity of the winter wheat, for in these twelve weeks there are only five or six in which new spring wheat reaches market in considerable quantities.

It will be noticed that the wheat receipts at these markets showed no tendency to increase or decrease for the eight years from 1870 to 1877, being larger in 1871 than in any of the four years from 1874 to 1877; and averaging 19,067,000 bushels in these four years against 20,012,000 in the four years previous. And almost the same may be said of the last nine years, 1878 to 1886. An enormous gain was made from 1877 to 1878, and then the movement became, barring accident to crops and other fluctuations, stationary. For the whole nine years, the average receipts for the 12 weeks have been 30,891,000 bushels, being 31,316,000 in the first five years of the nine and 30,109,000 in the last four.

This is a remarkable result, considering that not only Dakota has become a producer since 1877, but also that Kansas and Nebraska have increased their average production enormously since then.

Thus the average production per year in Kansas, Nebraska and Dakota, and the three together in the five years 1873 to 1877, the four years 1878 to 1881 and the four years 1882 to 1885 have been:

	1873-77.	1878-81.	1882-85.
Kansas	11.5	21.2	26.1
Nebraska	4 1	13.6	23.5
Dakota	1.0	4.0	19.5
Total	16.6	38 8	69.1

The increase in production of these states we should expect to have a greater effect on the receipts of the Northwestern markets than the production further east, because the states further west have a small population and consume but a small part of their production, and also because they are entirely west of these markets and all but a small part of their shipments to the East are likely to go to or through them, while a very large part of the Illinois surplus production and most of that of Indiana and Ohio does not go to any of these markets on its way to the East. Moreover, in a new country the necessities of the farmers are likely to compel them to sell their crop soon after harvest, so that the effect on the receipts previous to October may be much greater than on those of the whole year.

We see that the production of these three states increased 22 2 millions from the first to the second period, at which time there was an increase of about 10 millions in the receipts of the Northwestern markets; but there was a still greater increase, amounting to 30.3 millions, in the production from the second to the third period, and then there was *no* increase in the receipts of the Northwestern markets.

It should be said, however, that the total wheat production of the country has not increased since 1879 and but little since 1878. It was reported to be 420 millions in 1878, and was proved by the census to be 459 millions in 1879, and is given as about 442 millions this year, and has averaged 448 millions since 1878. The increase in production in the new states has been balanced by a decrease in production in the states further east. This has sometimes gone so far when the crop was very poor that some of the older Western states have not produced enough for their own bread. Illinois produced but 10.7 million bushels of wheat in 1885, and must have consumed as much as 15.7 millions; Missouri's 11.3 millions produced then must have lacked about a million of its consumption, both having wretched crops. The supply of the older West has doubtless drawn largely on the newer West, and this supply has gone directly to local mills to a large extent, and not to the great markets. But also a very large part of the increased production of the new territory has been ground before going to these markets, and of this no account is taken here. Full statistics of this are not at hand, but the reported flour receipts of the Northwestern markets for the 12 months to Oct 2 have not increased much in the last five years, having been in barrels:

1882.	1883.	1884.	1885	1886.
1,725.759	1,823,975	1,984,447	1,387,069	1,906,768

The increase over last year, however, is very large, though not proportionally as large as the increase in wheat receipts, being 37 per cent., while the increase in wheat receipts is 88 per cent. The receipts of flour and wheat together for the 12 weeks have been equivalent to the following *millions* of bushels of wheat:

1882.	1883.	1884.	1885.	1886.
42.8	55.8	43 0	26.8	46.8

In comparison with last year the gain is very large, and the receipts are also nearly a third more than in 1883, but only a little more than in 1882 and 1884.

The increase in the crop over last year is chiefly in the states east of the Mississippi, and an important part of the increase in the receipts of the Northwestern markets is doubtless due to the fact that grain has gone to them to be forwarded by lake from places which last year either had very little to ship, like Illinois and Missouri, or shipped directly through by rail. The increase in the receipts of the Atlantic ports (from 26.8 to 49.6 millions of flour and wheat) is greater than the increase in the Northwestern receipts, it is true; but we must remember that the whole increase in production is available for exportation. Actually the exports to Europe from Atlantic ports for these 12 weeks have been:

	1886.	1885.	Increase.	P. c
Flour, bbls	1,854.798	812,244	1,042,554	121 8
Wheat, bu	23.523,261	7,301,295	16,221.966	222 2
Total, bu	31.869,852	10,956,393	20,913,459	191 0

Thus the exports have trebled nearly, while the Northwestern receipts increased less than 80 per cent. and the Atlantic receipts 85 per cent. The *amount* of the increase in exports is nearly the same as the increase in receipts—20.9 millions increase in exports, against 20 in Northwestern receipts and 22.8 in Atlantic receipts. Thus, substantially the whole increase in the wheat marketed has already been exported.

So much of the not large crop has already come forward that a light movement might be expected for the remainder of the season, and that may be the case with the Northwestern markets. Most of the wheat is always marketed before the close of the year in which it was grown. Last year it was supposed to be held back more than usual on account of low prices, yet then 40.8 millions of bushels went to the Northwestern markets after harvest and before Christmas, and only 19 millions after Christmas till the new harvest; so also in 1884 71.6 millions went to market in 24 weeks after the harvest, and 30.4 millions in the following 28 weeks till the next harvest. The Northwestern receipts are still very large, however, and though they are not so large as they were earlier, they may be expected to exceed those of last year for the rest of the year, though last year receipts were largest after September, there being a large spring wheat crop and a very small winter wheat crop. So large an increase over last year as there has been heretofore is not to be expected in the Northwestern receipts, however, because the winter wheat has already been marketed to a great extent and the spring wheat crop is smaller than last year and has been forwarded earlier; thus the receipts at Duluth and Milwaukee for the seven weeks to Oct. 2 were 8,611,500 bushels this year, against 3,796,400 last year. They had large receipts through October and November last year, and as they have had a larger quantity from the smaller crop this year before October, it is not probable that they will have a gain for the rest of the year. The receipts of winter wheat may make up for any possible decrease there, but it is not to be expected that the gain in the whole Northwestern wheat receipts will be as great for the rest of the year as it has been for the past three months.

With the movement to the seaboard, however, it may be different. Stocks in Western elevators are unusually large, and shipments may be great if there is demand for the grain. Heretofore, as we have seen, the exports have absorbed the increase in receipts. These have fallen off largely of late, having been (flour and wheat) in each of the last eight weeks, in *thousands* of bushels:

Week ending—							
Aug. 14.	Aug. 21.	Aug. 28.	Sep. 4.	Sep. 11.	Sep. 18.	Sep. 25.	Oct. 2
3,415	3,787	3 484	2,544	2,828	2,215	1,945	1,850

Thus there has been almost a continuous decrease in the exports since the third week in August, until for the last week they are but half as great as then, and for the last three weeks they have averaged but 2,000,000 per week. If there is no further decline, a heavy movement from the West to the East may continue, but otherwise it may be light.

The early and heavy movement of wheat has been of material benefit to the Northwestern railroads, and a falling off in that movement would, of course, affect their earnings somewhat. The effect on traffic of marketing a large amount of produce continues, however, long after it is marketed, for virtually the produce is exchanged for goods, and almost all trade is likely to be more active for the remainder of the season because of the heavy wheat movement between June and October.

Earnings in August and for Eight Months.

Our large table of August earnings has reports from no less than 107 railroads—a much greater number than ever before given. The mileage, total earnings and earnings per mile of these roads in August were:

	1886.	1885.	Increase.	P.c.
Miles	77.151	74 439	2,712	3.7
Earnings	$45,677,209	$39,712.6 0	$5,964,529	15.0
Earn. per mile	592	533	59	11.1

This is a very great improvement over a very bad year. Last year the 86 roads reporting in August earned 6.8 per cent. less in the aggregate and 9.9 per cent. less per mile than in 1884, while in 1884 72 railroads earned 6.8 per cent. less in the aggregate and 12.1 per cent. less per mile than in 1883, when earnings were large. It appears, therefore, that the gains this year only about made up for the losses from 1884 to 1885, and not for those from 1883 to 1884. Exactly what the changes are since those years cannot be stated, however, because we have no reports from a large number of the roads for 1883 and 1884.

The aggregate earnings are considerably increased by the inclusion of the West Shore with the New York Central this year, but not last. The quarterly report of the West Shore for last year indicates that its earnings in August then were about $400,000, and if so the actual increase in the total earnings of the 107 roads was from 40.1 to 45 7 millions, or 13.9 per cent., the earnings per mile remaining as above.

The number of the railroads reporting is itself evidence of the general and large increase in earnings, the number always being greater when they are good than when they are bad. Of the 107 roads reporting, only nine have smaller total earnings this year than last, and only 12 smaller earnings per mile.

Nearly half of the whole increase of the 107 railroads was made by those in the East and those north of the Ohio and east of Chicago & St. Louis—the field where the demoralized trunk-line rates were making havoc last year. The 19 Eastern roads (allowing $400,000 to the West Shore last year), with about a sixth of the total mileage, made more than a third of the total increase in earnings. There were great gains, however, in other districts, as 17 per cent. by the lines northwest of Chicago, 19 per cent. by those southwest of St. Louis, and 12 per cent. by the Southern roads east of the Mississippi, not to say 19 per cent. by those northwest of St. Paul, which alone have a large increase in mileage (16 per cent). The least improvement is by the lines in the Far West, but theirs is 7½ per cent.

As was to be expected, the lines which have a considerable trunk-line through traffic have generally great gains; in the aggregate those reporting gained $2,190,000, or 19 per cent.

For the eight months ending with August our table has reports from 100 railroads, in the aggregate as follows:

	1886.	1885.	Increase.	P.c.
Miles	74.698	72.409	2.314	3.2
Earnings	$304,865.204	$280,928,522	$23.936,682	8.5
Earn. per mile	4,081	3,877	204	5.3

More than one-fourth of this great increase in earnings was made in August, and about one-half in July and August, which shows how favorable the change has been since June. Every section of the country shows some gain for the eight months, but more than two-thirds of the whole increase has been by the lines north of the Potomac and the Ohio, which have but 30 per cent. of the mileage. For the first six months of the year, only these lines, those northwest of St. Paul and the Southwestern roads had made considerable gains, while the Southern roads and the Northwestern lines, having 36 per cent. of the whole mileage, had earned less than last year, and the roads in the Far West had gained but 2.1 per cent.

The improvement which in the first half of the year was confined chiefly to the lines in the most thickly peopled part of the country, east of Chicago and St. Louis and north of the Ohio and the Potomac, has since become general, and is great in the Northwest and the South.

The prosperity of the lake vessels leads many to suppose that there have been extraordinarily large grain shipments by lake this year. It is true they have been large, but not so much larger than in recent years as to be remarkable, and not so large as in some years. From the opening of lake navigation to the end of September the shipments of grain by lake, down the Mississippi and by rail have been, in bushels, for the last six years:

Year.	By lake.	Down Miss.	By rail.	Total.
1881	66,356,992	5 807,518	47,594,719	119,759,219
1882	50 743,960	4 243,098	39,323 545	94,310.603
1883	71.641,764	4,582 111	40,447 213	116,671,088
1884	57,940.006	4 420.964	51,327.487	113.6?8 457
1885	52,248 325	3,327,304	50,180.162	105,755,791
1886	62,088,674	4,546,679	39,759,384	106.394.737

We see that the lake shipments this year, though 18.8 per cent. more than last year, were but 7 per cent. more than in 1884, and were 13 per cent. *less* than in 1883, and 6⅛ per cent. less than in 1881. The shipments by rail are a fifth less than last year or the year before, when rates were excessively low, but were nearly the same as in 1882 and 1883. The river shipments have not varied greatly, and have never been very important.

The percentage of the total shipments going by lake, river and rail have been:

	1881.	1882.	1883.	1884.	1885.	1886.
By lake	55.4	53.8	61.4	51.0	49 4	58.3
By river	4 8	4.5	3 9	3 9	3.1	4.3
By rail	39.8	41.7	34 7	45.1	47.5	37.4

The proportion of the whole shipped by lake is larger this year than in any of the other five except 1883.

It is not the amount of grain shipped that has made vessels scarce and freights high this year, but the coincidence of large grain shipments, lumber shipments and iron ore shipments.

At the Louisville & Nashville election last week Mr. Extine Norton, of New York, who has been Vice-President, and practically the head of the financial department, was made President, while Mr. Milton H. Smith, who has been President and has directly managed the railroad was made Vice-President, though with the same duties and executive authority as before. Mr. Norton is a man whom capitalists trust, and has been of great service to the company in its days of financial embarrassments, and at that time, when financial credit was the all-important matter for the company, it would have seemed natural to prefer such a man for the presidency, or at any time when a vacant place is to be filled — proprietors usually selecting for the responsibility of conducting a business one who is largely interested with them as a proprietor. It seems unfortunate in this case that to make such a selection a man of such notable ability and character should, nominally, at least, be moved down a grade, at a time when, thanks largely to his management, the question of financial credit in the money market has ceased to be the controlling one with this company. When a corporation has been fortunate enough to secure a man who to marked capacity for conducting its affairs unites a single-hearted devotion to its interests, such as most men are not capable of, it should be very careful to avoid even the appearance of slighting him.

The through shipments of freight from Chicago in September last by the eight roads reporting (not including those by the Chicago & Atlantic and the Wabash) were 148,737 tons, while for seven years previous the September shipments by all the roads had been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
134,141	151,464	265,414	153,234	194,124	166,729	300 688

The shipments by the roads not reporting would make the shipments last month probably not more than 175,000 tons, which is more than in any other year when rates were tolerably maintained except 1882, if rates may be said to have been tolerably maintained then, when the Erie was getting an unprecedented business by cuts, and some of the other roads doubtless were meeting it, though the rates may not on the average have been much less than this year, when the rates were not firmly maintained, though the reductions were not large. The rates last year probably averaged little more than half of what they have been this year, so that the gross receipts from the traffic were greater this year than last.

The reported shipments last September were 30,600 tons (25 per cent.) more than in August, and were the largest since March. A large gain in September over August is not uncommon, but only last year was it as much as 30,000 tons, so there has been an unusual improvement in the business there, which the high lake rates has favored, and perhaps also some reduction in the rail rates, which were perhaps cut more generally in September than they had been previously. Recently some important lines have been so pressed for cars that they have restored rates.

The percentage of the shipments carried by each railroad in September was:

C. & G. T.	Mich. Cen.	Lake Shore.	Nickel Plate.	Fort Wayne.	C., St. L. & P.	B. & O	C., L., St. L. & P.
7.1	27.4	18 8	9.6	18.6	11.0	5.5	2.0

Thus the three Vanderbilt roads carried 55.8 per cent. of the whole, and the two Pennsylvania roads 29.6. The Grand Trunk's percentage was unusually small. The shipments by the Cincinnati, Indianapolis, St. Louis & Chicago have not been reported before.

Perhaps no valuable and revenue-earning property of any kind is so lightly treated in the way of keeping track of it as freight cars. One very good reason for this is that, although these $500 properties which ought to earn and often do 75 cents per day, are permitted to go hither and yon as any one chooses to send them, without its owner ever having the slightest evidence as to where it goes and what it really earns, yet the number of persons (corporations) which can get hold of it and use it as their own is in the nature of things limited to responsible parties who appropriate the property through salaried employés who have no personal inducement not to make fair returns. Nevertheless, the abuses and annoyances are great. We have known, in a busy time, a whole train of foreign flat cars to be quietly worked into construction service and kept there some weeks, and in a smaller way a good deal of this goes on whenever cars are in demand.

The rational and business-like plan seems on general principles to be that of individual daily reports of what each car which is wandering abroad is doing. The lost car trouble then sinks out of sight, and that it would have a healthy effect in keeping cars moving and correcting occasional errors, and even dishonesty, is quite certain. A system of this kind was devised by A. W. Davies, Car Accountant of the New York, Pennsylvania & Ohio Railroad, and went in force some years ago on a great number of roads, including some of large traffic; but, though it was very warmly favored by some of the ablest managers, it met with so much opposition or apathy that it seems to have been given up by the companies which approved it most.

Meanwhile junction reports have come in, by which a road has at least information as what road its cars were on when last heard from, so that it knows where to look for them, but that the difficulty in the working of this system (and still worse of no system) which a correspondent discusses this week is a real one, is evident from the large amount of talk about it at every succeeding convention. This correspondent makes a proposition which is business-like in principle and ought to be effective. It is certainly not asking much that those who are receiving thousands of dollars worth of other people's property every day should give a receipt for it which would hold them responsible without further formality unless they could produce a corresponding receipt for its delivery to some other corporation.

The "Alphabetical list of patentees and inventions" for the quarter ending March 31, 1886, shows that car couplers still retain their exalted preëminence in the patent applications, no less than 63 new "car couplers" having been patented in the last three months, which is about twice as many as of any other one device. As the proportion of rejected claims must, one would think at least, be far larger in this class than in most others, the fascination which the car coupler problem has always had for inventors will be seen still to exist. Perhaps, however, the patent office examiners have in their despair abandoned all careful search among the nearly 4,000 coupler patents for prior inventions. Otherwise it would seem impossible that more than a very few applications should pass the search for novelty.

Among the other much patented devices, every one of them of kinds which would seem to have been patented to death before, are 20 nut-locks, 11 injectors, 8 fences (with 30 others relating to fence-), 16 car brakes, 8 car-axle boxes, 9 seal locks, 9 stock cars, and 6 snow plows, with the usual run of new buckles (10), bustles (6), buttons (16), churns (16), coffins (10), horseshoes (13), rotary engines (10), roller skates (21), and such like. Contrasting notably with this there is only one patent for extracting aluminum, 6 for air brakes, including 3 for electrically expediting their action—a most hopeful direction for effort—9 electric railways, 3 cable railways, 1 elevated railway, 1 "duplex locomotive," and other locomotive patents, 6 railway switches and 1 "railway system"—whatever that may be.

George Westinghouse, Jr., took one more patent on conveying gas, Edward Weston took six, Lewis H. Nash, 23, on water meters, Edison only two, George H. Corliss five, and a number of electrical inventors six to 12 each, with one list of 13 to one man in fire-proof construction.

The zeal of converts is proverbial, and we have another illustration of it in the last issue of *The Engineer*. Few people trouble themselves now-a-days to remember ancient history, but those with a good memory for it will recall that away back in the dark ages before 1876 both *The Engineer* and *Engineering* were strong advocates of the narrow-gauge, having practically swallowed whole the theories of Mr. Fairlie. But "truth recovers if it be run over by a locomotive, while error dies of lock-jaw if it scratches its finger," and that truth is rather more than holding its own in the office of *The Engineer* may be witnessed by the following quotations, which are apropos of some projected 2 ft. lines in Ceylon:

"It will be conceded, we believe, that under any conditions a break of gauge must always be productive of inconvenience. We do not say that it can never be justified, but the reasons for its adoption must be exceedingly strong to warrant it.

"It may well be doubted if in a country where neither severe gradients, curves, or embankments, are required, and where the cost of land is *nil*, a narrow-gauge line offers any material gain in the matter of first cost, its character in other respects being equal; *while few will be found to dispute that the working expenses, as compared with paying load, increase in direct proportion to the narrowness of the gauge.*"

We must confess to some doubt as to precisely what is meant by this closing sentence, but if it means, as apparently it does, that the expenses per ton or passenger mile "increase in direct proportion to the narrowness of the gauge," *The Engineer* has outdone us in opposition to the system. We should not venture to assert that, on a given system of roads laid out in an isolated region like the island of Ceylon, so that the conditions other than gauge would be equal, the expenses per ton mile would be:

On gauges of	4 ft	8½ in.	3 ft. 2 ft.
In the proportion of	1	1 57	2.35

The Engineer then goes on to remark:

"It is certain that logs of 40 ft. or 50 ft. can hardly be safely carried upon a very narrow gauge, for reasons which it is not necessary to detail to the readers of *The Engineer*. *The broader the gauge to be employed on such lines the greater will be the facilities for utilizing profitably the vast areas of forest* through which the lines of railway must be carried in the low country of Ceylon."

This italicized statement is again too broad-gauged for us. We seriously doubt whether gauges wider than 8 or 10 ft., at the outside, will offer any advantage, even for the Ceylon timber traffic. On some construction details, however, we are glad to be able to agree more closely.

"Very careful estimating has demonstrated that between the cost of a railway of 5 ft. 6 in. gauge and one of 3 ft. 6 in., or of metre gauge, in the hill country of Ceylon, there is only a margin of £1,000 per mile, and it is admitted that to secure such a limited saving the break of gauge is not desirable.

"Then, again, how is the question of the increased sleeper base [for a 3-ft. gauge], which it is admitted is a necessity, to be met? Longitudinal, or continuous sleepers, can hardly, we should say, be adopted upon a very narrow gauge exposed to the exigencies of a traffic of first-class character. *If, therefore, it must prove necessary to increase the length of the sleepers themselves, what becomes of the economy to be gained in constructive cost?* If the length of the sleepers has to be made equal—say, to those required for a 3 ft. 6 in. gauge—the roadway must be made equivalent, and, as we have said above, it has been shown that for such a gauge a saving of but £1,000 per mile can be anticipated."

The question italicized has been often asked in this journal. We are glad to see that its force is more generally appreciated. In a year or two more perhaps the dubiousness of the alleged "saving" of £1,000 per mile will likewise become visible.

Duluth wheat receipts have fallen off again; but they were still in the week to Oct. 2 more than a million bushels more than at Chicago, Milwaukee and St. Louis together, and more than they had ever been in a single week until this year. This is the fourth successive week that the Duluth receipts have been more than a million bushels, and in these four they were 5,447,407 bushels, which is about the same as the wheat receipts at Chicago for the last *eleven* weeks, and much more than the wheat receipts at St. Louis in the four weeks when they were heaviest, namely, from July 11 to Aug. 7, when they were 4,549,000 bushels. In 1885 the Duluth receipts for the whole year were 14,520,625 bushels, which was more than ever before. This year in the *seven weeks* to Oct. 2 they were 7,419,075 bushels, and for the nine months 13,390,900, with three months remaining in which last year half its receipts arrived. Its season being short, Duluth may not be the greatest of Northwestern wheat markets for the whole year, but it cannot lack much of it.

The report of breadstuffs exports in September last shows a great increase compared with last year in wheat and flour exports (nearly 200 per cent. in wheat and more than 33⅓ in flour) and a large decrease (30 per cent.) in corn, and in all grains and flour an increase from 12.4 to 17.4 millions of bushels, or 40 per cent. The exports from the Pacific coast made about one-third of the total wheat exports in both years, in September, and nearly a fourth in the three months ending with September, but only one-eighth of the flour this year. Flour exports from Baltimore are not so large as they have been in recent months, being 100,884 barrels in September against 491,038 in July and August, but still they were nearly four times as great as last year. In July and August, Baltimore received more than Boston; in September, not half as much. The exports of wheat from San Francisco were probably more than those from New York. San Francisco and Portland are reported together, and together they exported nearly a third more than New York in September, but nearly a third less in the three months ending with September. The wheat seems to be worth about 10 cents a bushel less in San Francisco than in New York, having a voyage 12,000 miles longer to make to reach the same market, the average reported value being 80 cents per bushel in San Francisco and 90 in New York.

Further reports of September earnings are generally favorable; of 37 roads reporting this week, only nine showing a decrease compared with last year, though most of the gains are not very large. The most notable, perhaps, is that of the Grand Trunk, which is 17½ per cent., and that of the New York Central, which, allowing $400,000 for the West Shore last year, is still nearly 22 per cent. The Southern lines of the Illinois Central show a large decrease (10 per cent.), which comes after a decrease of 5.7 per

cent. last year. Its Illinois lines have a small, and its Iowa lines a large increase. The Richmond & Danville system and the East Tennessee both lose about 5 per cent. The Texas & Pacific, which had a decrease of 15.4 per cent. in August, has an increase of 24 per cent. in September. The other Texas roads reporting, the Gulf, Colorado & Santa Fe and the Ft. Worth & Denver, have very small gains.

The enormous increase in the earnings of the Chicago, Burlington & Quincy Railroad in August was almost entirely in freight earnings. Passenger earnings were slightly less than in 1883, while freight earnings were 12 per cent. greater. For four years the earnings from different sources in August and the eight months ending with August have been:

	1883	1884.	1885.	1886.
August:				
Passenger....	$538,373	$500,316	$487 706	$526,790
Freight	1.847.703	1,778,652	1,602,502	2,074,818
Miscellaneous	109,047	168.525	134.096	146,507
Total.... ...	$2,495,124	$2,447,494	$2,224,303	$2,748,175
Eight months:				
Passenger....	$3,295.748	$3,441,811	$3,245.375	$3,520,879
Freight.	11,628 513	11.377,622	12,101,026	11.971,733
Miscellaneous	800,770	979,281	1.063,704	1,109,663
Total.... ...	$15,725.032	$15.798,715	$16,410,105	$16,602,275

In August the increase over last year in passenger earnings is 8 per cent., in freight earnings 29 per cent.; but for the eight months there is an increase of 8½ per cent. in passenger earnings and a decrease of 1 per cent. in freight earnings. The latter have changed greatly for the better since June, while the course of passenger earnings remains without much change.

The Chicago dressed beef shippers, having captured the larger part of the Eastern market, are looking for new fields to conquer, and propose to ship fresh meats westward to interior points in Illinois, etc., where the neighborhood supply of cattle is always much greater than the consumption. On their complaint that the third-class rate on this freight established by the Illinois state schedule was too high, a meeting of the Illinois Railroad Commissioners was held in Chicago last week, at which the parties interested were heard, after which the Commissioners changed the classification for dressed beef, when shipped in car-loads, and ice is provided by the shippers, from third class to fourth.

To the extent to which this business succeeds it will increase transportation, giving a haul of the cattle to Chicago and of the meat back from Chicago, where now there is none. It was suggested at the meeting that the reduction of the rate from Chicago westward would necessitate its reduction from Omaha and Kansas City eastward, which might result in driving the Chicago shippers out of the market, but they evidently are willing to take that risk.

This is only another instance of the way in which transportation is utilized when it becomes cheap. It seems absurd at first sight to send a fat animal 200 miles to Chicago to be slaughtered, and then send its carcass back again to be eaten; but it is claimed that it is really economical, it being very much cheaper to dress the cattle at a large slaughter-house than at a place where only a few are killed, while the offal has a considerable value at the Chicago slaughter-house and less than none (for it has to be disposed of) in the country.

For years the cattle have been great travelers. Young cattle are taken from the dairy country near Chicago to the Western ranches; shipped back when grown, either fat or to some grain-growing country to be fattened; and now the beef of these same cattle may make another journey to the home of their calfhood to be eaten, having traveled a thousand miles west, 1,200 east, and 200 miles west again.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Annapolis & Baltimore Short Line.—Extended to the Severn River, Md., 2 miles.

Carolina Central.—Extended west to Ellenboro, N. C., 4 miles.

Chicago, Milwaukee & St. Paul.—The *Elkader Branch* is extended from Sulta, Ia., to Elkader, 5 miles.

Eufaw ville.—Extended from Vance's Ferry, S. C., north, 7 miles.

Gulf, Colorado & Santa Fe.—On the *Dallas Branch* track is laid for forty-one miles from Dallas, Tex., an extension of 14 miles.

Kansas City, Memphis & Birmingham.—Extended from Holly Springs, Miss., eastward 21 miles; also from Tupelo, Miss., west 18 miles.

Kansas, Nebraska & Dakota.—Extended from Paris, Kan., northwest to Waverly, 11 miles.

Marietta & North Georgia.—Extended from Toccoa River, Ga., north by east 7½ miles.

Minnesota & Northwestern.—Extended from Fredericksburg, Ia., southwest 17 miles.

Missouri Pacific.—The *Leroy & Caney Valley Branch* is completed from Leroy, Kan., south by west to Fredonia, 40 miles.

Norfolk & Western.—The *Cripple Creek Branch* is extended from Barren Springs, Va., southwest to Foster Falls, 6½ miles.

Northern Pacific.—The *Cascade Division* is extended from Ellensburg, Wash., west 12 miles. The *Spokane & Palouse Branch* is completed from Marshall to Belmont, Wash. Ter., 43 miles.

St. Paul, Minneapolis & Manitoba.—The *Devil's Lake Branch* is extended west to Minot, Dak., 7 miles.

AVERAGE RESULTS OF BRICK TESTS FOR VOSBURG TUNNEL.

Chief Engineer's Office, Lehigh Valley Railroad. Mauch Chunk, Pa., May, 1886.

Maker.	Class of brick.	Av. vol. in cu. ft.	No. of brick per cu. ft. (with joints) in 15½ brick walls	Absorption tests. Before absorbing water	Absorption tests. Water absorbed.	Absorption tests. Percentage of water absorbed (in proportion to original weight.	Crushing tests. Cracked per sq. in	Crushing tests. Crushed per sq. in	Bending tests. Ultimate weight at which brick broke	Bending tests. Equivalent max. tensile strain in extreme upper fibre.
				Lbs.	Lbs	Per ct.	Lbs.	Lbs.	Lbs.	Lbs.
A—100 tests	Very hard	0.041	20.27	4.089	0.679	16.7	1806.5	3338	1916	1199
	Hard	0.041	20.27	4.375	0. 53	21.7	1317.5	2572.5	728	452
	Medium	0.043	18.44	4 265	1 091	25.6	814.5	2817.5	887	563
	Very hard	0 041	19.5	4.250	0.531	12 5	1225	2577.5	1640	944
	Hard	0.042	19.0	4.437	0 953	21.5	159 .5	3430	1268	770.5
	Medium	0 046	16.9	4 531	0.937	20.7	2082 5	2817.5	836	442
	Very hard	0.039	20 3	4.773	0 578	12.1	2541.5	3920	1612	1045
	Hard	0.042	19.48	4 734	0 750	15.8	2297	3515.5	1147	710
	Medium	0 045	17.72	4.914	0.945	19.2	888	1621.5	444	281 5
B—12 tests	Very hard	0 043	16 90	5.547	0.451	8.2	.....	.....	724	.....
	Hard	0 040	19.34	4.680	0.516	11 2	2143.5	4067	609	389
	Very hard	0 039	20.32	4.696	0.507	10.8	2725 5	3920	934	613
C—24 tests	Very hard	0.036	21.31	4.297	0.528	12.2	1641	2511	1632	1221
	Hard	0.038	20.14	4 250	0.538	12 6	822 5	3 62.5	656	444 5
	Medium	0.039	20.03	4.233	0.578	13.6	1408.5	2511.5	756	530
	Very hard	0.040	19. 2	4.383	0 754	17.2	795	1974	443	290
D—24 tests	Hard	0.045	17.72	5 574	0.568	10.2	3062	4410	1733	1133
	Medium	0.037	20.72	4.565	0.495	10.8	3307	4532	1198	818
	Soft	0.037	20.72	4.427	0.485	11.0	2205	3675	1943	1450
E—50 tests	Very hard	0.036	21.31	4.505	0.292	6 4	3871	5537	2982	1588
	"	0 042	19.0	4 758	0.659	14 0	2205	4042	1102	716
	Hard	0 042	19.0	4.501	0.693	15.4	1960	3063	1450	893
	Medium	0.041	19 5	4.565	0.864	18.9	2695	4287	1066	641
	Soft	0.045	17.72	4.406	0 980	22.2	1102	2205	552	2 9
F—12 tests	Hard	0.041	20.72	3.936	0 601	15.4	1470	3210	1019	645
G—12 "	"	0 041	20.72	3.945	0.640	16.2	1531	2971	1013	645
H—24 "	"	0.040	19.34	....	.....	.....	1517.5	2858.5	565	358.5
I—50 "	"	0.039	20.0	4.425	0.406	16.0	2600	3730	1795	1796
J—12 "	"	0.039	20.1	4.697	0.420	17 3	1347.5	4226	2607	1670
K—50 "	"	0 039	20 2	3.989	0.818	36.0	1061.6	35 2	1661	1068
Refuse slate—5 tests	"	0 041	20.27	4 288	0.812	31.3	1102.5	2572.5	1146	639
	Very hard	0.049	.....	5.828	0.634	20.8	4450	5701	.....	.....

Sebasticook & Moosehead Lake.—The first track is laid, from Pittsfield, Me., north 3 miles.

Southern Pacific.—The *Northern Division* is extended from San Miguel, Cal., south by east to San Ardo, 8 miles.

This is a total of 228 miles on 15 lines, making 4,261 miles reported so far this year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles		Miles.
1886...	4,261	1881.	5.340	1876	1.740
1885	1.825	1880	4.135	1875	902
1884	2.806	1879...	2,507	1874	1,180
1883	4.629	1878	1.422	1874	2,897
1882	8,081	1877	1.548	1872	5,147

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Pattern Making. A practical Treatise embracing the main Types of Engineering Construction. By a Foreman Pattern Maker. Crosby, Lockwood & Co., London.

Rarely have we seen a work of which it could with more confidence be said than of this that it should be in the hands of every man interested in its subject. For draftsmen, designers of machinery and those who are by study or practice mechanical engineers it should be especially useful, going as it does into details which are often of much importance in the design of machinery and liable to be overlooked by those not practical molders or pattern makers.

The work includes 270 pages of type and 370 illustrations, and is in the main a reprint of articles which appeared in the *English Mechanic.* It cannot, of course, be followed too literally in all its details in American practice, but the details of pattern making are much the same the world over, and few mechanical specialties have been better covered by special treatises.

TRADE CATALOGUES.

Cranes. An Album of Crane Designs by the Yale & Towne Mfg. Co., Stamford, Conn.

The prominence of this company in this particular specialty is well illustrated by this lit le book of 89 small plates, showing some 100 or more forms of cranes of all degrees of elaboration and power, or considerably more than were illustrated in the "Treatise on Cranes," by Henry R. Towne, M. E., which we noticed Feb. 1, 1884, as "a model treatise of its kind, and the best book on the subject." This little pamphlet is in no sense a treatise, and shows much fewer details than the larger publication, but it would appear as if it showed something to fit all needs, and it would probably be much to the advantage of the railroad system of the country if it were carefully studied.

Brick Tests at Vosburg Tunnel.

Both the brick and cement used at this tunnel, which we described in our issue of Oct. 8, were very carefully tested. The cement tests showed nothing especially new, but the brick tests, as summarized in the table below, were of interest. The crushing tests for brick were made on a wheel press in the car shop at Packerton, and are only comparative for this table, as the shaft moving at each stroke of the pump upon the bricks set between pine blocks was somewhat similar to a blow.

The bending tests were made by supporting the centre of the brick on a fixed steel bar, and inclosing its ends within a stirrup made of flat iron, to which was hung a barrel for carrying the loading. The fixed bar was ½ in. wide, and the bearing clips of the stirrups about the same. It was noticeable that the bricks which stood the crushing strain well did not all do well under this test. All brick excepting the first lot were selected as average brick by the inspectors. The table is an average of all tests made, which were embodied in other more detailed tables.

THE SCRAP HEAP.

Hunting Deer with a Locomotive.

This morning between 11 and 12 o'clock, train 6 over the Delaware Division was bowling along at a high rate of speed about two miles this side of Parker's Glen, when engineer Merritt Turner saw a handsome buck deer on the track about a quarter of a mile ahead of him. The track at this point runs for miles along the side of the mountain, its precipitous sides being on the south side and the Delaware River on the north, 30 ft. below the level of the track. The deer could not climb the mountain and evidently did not relish the idea of making the 30 ft. jump, so it increased its speed and bounded away down the track ahead of the approaching train. Engineer Turner took in the situation, and throwing his engine wide open started after the affrighted animal. It was lungs and wind against steam and axle grease, and the latter won. The deer was overtaken and the monster locomotive threw the poor creature with great force against the rocks, fatally injuring it. The trainmen cut the animal's throat, threw the carcass on the pilot of the locomotive and brought it to this village. It will be divided among the trainmen and they will live on venison for the next week.—*Port Jervis (N. Y.) Gazette, Oct. 7.*

The Cost of the Bardwell's Ferry Accident.

The Boston *Advertiser* of Oct. 7 says: "It is just six months ago to-day that a train of six cars plunged down a precipitous embankment on the state branch of the Fitchburg road, carrying 10 persons to death and over 30 others to injury. The road-bed had been dug up in the presence of the Railroad Commissioners, experts have testified as to its construction and a retaining wall has been built.

"Besides the expense to the state arising from repairs of track and loss of rolling stock, there has been a long personal damage bill to settle. The Railroad Commissioners long ago decided that the Fitchburg road was in no wise to blame and that the state would have to pay. The adjustment of the claims has been made through Judge G. A. Torrey, Counsel for the road, however, and it is the opinion of eminent authorities that much has been saved to the state.

"The settlements are nearly completed and as fast as made are reported to the Governor and Council, who will finally pass on them. The total amount will be somewhere between $100,000 and $125,000, paid to 43 persons of the 48 wounded or to representatives of the dead. The largest sum paid to any one person is understood to be about $2,500. The case in which no settlement has yet been reached is that of Fireman Littlejohn, who wants not only damages for himself but $5,000 each, it is said, for the two little children he lost in the disaster. Mr. Littlejohn has threatened to sue if he does not get the money he asks. The answer to the Littlejohn plea is that both he and his children were riding on the train free, and on passes not issued by the road but by Manager Locke in his private capacity."

Extra Duty for the Conductor.

Oliver Howlett and Emma Whitmire made up their minds to be married while traveling on the Williamsport & North Branch Railroad in Pennsylvania, Oct. 8. They asked the conductor, Rev. W. H. Lilly, to tie the knot, and he complied. It is not every conductor who can be so accommodating.

Brakemen Must Speak Clearly.

For years the public have been complaining because brakemen indistinctly call out the names of stations. Superintendent Blackham has undertaken to make further complaint unnecessary, at least so far as the Susquehanna Division of the Erie is concerned. An order issued to passenger conductors requires them to see that the announcement of the names of stations be made twice in each car, and in all cases in a clear and deliberate manner, and with voice enough to be distinctly heard by the passengers.

The Solution of the Brake Problem.

A rural exchange publishes the following letter from a correspondent: "In the matter of freight train brakes, I would state that their adoption depends on their immediate usefulness at the time of application on the cars.

"For example: Consider yourself a railway manager having control of 300 or more engines, and upwards of 10,000 cars, on which you would like to apply power-brakes, provided you could do so, and use them as fast as applied: but if obliged to equip the major portion of your motive power and cars before the brake would be serviceable as a train-

brake, would cause you to put off doing so almost indefinitely.

"While on the other hand, if the cars could be used as fast as the brakes are applied in brake-train service, without reference as to their (train) location, when in sections of two or more cars up to the entire train, and operated simultaneously by one person in one operation from one of the cars with an effort not exceeding 25 lbs., then the freight-train-brake problem is solved, and not till then."

A Model Depot.

The Railroad Commissioners of Iowa were at Keokuk a few days ago, hearing the complaints of our citizens and city government with reference to a lack of depot facilities, that city having asked the commissioners to compel the railroad companies to provide proper accommodations. The representative of one of the lines against which complaint had been entered, and which has no depot at all, but lands its passengers in the street, argued that his company had fully complied with the law, which stipulates that the depot shall be light and well ventilated, and of sufficient size to accommodate travel.

"I submit," said he, "that our depot is the best lighted of any in any city in the country, and as to ventilation, it is perfect, and I defy any one to gainsay the statement. It is true that the roof leaks occasionally, but that complaint cannot be justly entertained now, for it has not leaked a drop for weeks past."

The argument was enjoyed by its hearers as a unique specimen of facetiousness, but when the drouth subsides that company will likely have to put a new roof on their commodious depot.—*Exchange.*

Railroad Young Men's Christian Association.

The Association at Columbus, O., reports an attendance at the rooms in September of 939, and at the Sunday services of 185; a total of 1,154. The reading room is now supplied with a carefully selected assortment of papers and magazines.

The Association at Atlanta, Ga., publishes a monthly paper called *Links and Pins*, which gives a variety of interesting local news. For August a total attendance of 1,129 is reported at the rooms. There were two Gospel meetings, with a total attendance of 83; two song services, 27; and a social meeting, at which 76 were present. The Secretary reports a total of 187 visits made and 1,450 circulars and invitations issued.

The Association at Indianapolis is at present in temporary and very insufficient quarters in the Vandalia freight house. Mr. George W. Cobb, Secretary, reports the attendance for the six months past at 829; he made 79 visits to shops, yards, etc., and thinks that good has resulted in numerous instances. When a new depot is built, decentac commodations are promised and the Secretary says that they will then establish reading ond writing classes and will offer a pleasant place of resort to callers.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Baltimore & Ohio, annual meeting, at the office in Baltimore, Nov. 15.

Cincinnati, Sandusky & Cleveland, annual meeting, at the office in Sandusky, O., Oct. 20.

Evansville & Terre Haute, annual meeting, at the office in Evansville, Ind., at 2 p. m., on Oct. 18.

Western Maryland, annual meeting, in Hillen Station, Baltimore, Oct. 20, at noon.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

St. Paul, Minneapolis & Manitoba, 1¼ per cent., quarterly, payable Nov. 1. Transfer books close Oct. 18.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Brotherhood of Locomotive Engineers* will hold its annual convention in New York, beginning on Wednesday, Oct. 20.

The *New England Road-masters' Association* will hold its fourth annual meeting at the Hotel Windsor in Manchester, N. H., beginning at 2 p. m., on Wednesday, Oct. 20.

The *Railroad Conductors' Life Insurance Association of the United States and Canada* will hold its 19th annual convention at Ford's Opera House, Baltimore, on Wednesday, Oct. 20.

The *Association of Railroad Trackmen of North America* will meet at Council Bluffs, Ia., on Thursday, Nov. 25.

The *Master Car-Builders' Club* holds its regular meetings at the rooms, No. 113 Liberty street, New York, on the third Thursday in each month.

The *New England Railroad Club* holds its regular meetings at its rooms in the Boston & Albany passenger station in Boston, on the second Wednesday of each month.

The *Western Railway Club* holds its regular meetings at its rooms in Chicago on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Time Convention.

The General Time Convention met at the Hotel Brunswick, in New York, Oct. 13, with 125 members present. President George W. Parker occupied the chair, with R. R. Bridgers and J. M. Toucey Vice-Presidents, and W. F. Allen Secretary.

The first business taken up was the report of the Committee on Uniform Train Rules, which presented an elaborate code of train rules for general adoption. The first day was entirely devoted to the discussion of this report, a substantial agreement being reached on most of the proposed rules. The discussion was not finished, however, and the Convention adjourned over until the next day.

Master Car-Builders' Club.

A business and social meeting of the Master Car-Builders' Club will be held at the Rooms, No. 113 Liberty street, New York, on Thursday, Oct. 21, at 8 o'clock p. m., to make arrangements for the series of meetings for the coming winter. A general attendance is requested.

Western Railway Club.

The next meeting of this club will be held in the Grand Pacific Hotel, Chicago, Oct. 20, at 2 p. m.

The subjects for discussion are:

1. The first six rules of interchange of cars.
2. Locomotive driving-wheel centres and section of tire for driving-wheels.

ELECTIONS AND APPOINTMENTS.

Astoria & Tillamook.—The incorporators of this new company are: G. Wingate, James McL. Harvey, J. O. Hawthorn, J. C. Trullinger, G. E. Withrington. Office at Astoria, Oregon.

Cairo, Vincennes & Chicago.—Mr. Abel S. Marckley has been appointed Superintendent of Bridges and Buildings, in place of Mr. C. D. Bradley, resigned.

California Southern.—The office of the Superintendent, Mr. J. N. Victor, has been changed from Colton, Cal., to San Bernardino, California.

Canada Atlantic.—Mr. Percy R. Todd has been appointed General Freight and Passenger Agent, in place of Mr. A. G. Peden. Headquarters, Ottawa, Ontario.

Canadian Pacific.—Mr. Wm. Whyte has taken charge of his new office as General Superintendent of the Western Division of this railway, with headquarters at Winnipeg, Manitoba. Mr. C. W. Spencer is Acting General Superintendent of the Eastern and Ontario divisions.

Cape Fear & Yadkin Valley.—The following from General Superintendent J. W. Fry, is dated Greensboro, N. C., Oct. 7: "Mr. John M. Rose having resigned the office of General Freight and Passenger Agent of this road, Mr. W. E. Kyle has been appointed his successor, taking effect Oct. 11, 1886."

Charleston, Cincinnati & Chicago.—The first annual meeting of this company as consolidated was held at Charleston, S. C., when the following directors were elected: Frank Coxe, Asneville, N. C.; Thomas G. Baker, Charleston, S. C.; H. D. Lee, Shelby, N. C.; Richard Dozier, Georgetown, S. C.; John T. Wilder, Chattanooga, Tenn.; H. K. Baker, Wm. K. Baker, Springfield, Mass.; E. S. Brown, Hartford, Conn.; James D. Blanding, Sumter, S. C.; P. J. Sinclair, Marion, N. C.; W. F. Callender, Springfield, Mass.; P. P. Dickinson, D. N. Coats, New York. Mr. Frank Coxe was elected President and H. G. Baker, of Springfield, Mass., Secretary and Treasurer.

Chicago, Kansas & Western.—The directors of this company are: Joab Mulvane, P. I. Bonebrake, J. P. Griswold, John R. Mulvane, J. F. Parmlee, Topeka, Kan.; D. M. Finney, Neosho Falls, Kan.; I. A. Burdette, H. S. Burdette, D. L. Dallup, E. W. Kinsley, A. W. Luke, J. F. McKien, E. I. Thomas, Boston.

Chicago, Milwaukee & St. Paul.—Mr. J. H. Hartigan is appointed Assistant Superintendent of the Chicago & Council Bluffs Division in place of L. B. Beardsley, resigned. Mr. Hartigan was recently in Texas, on the Missouri Pacific.

Cincinnati & Eastern.—Mr. J. T. Bothwell, formerly of the Scioto Valley, has been appointed General Roadmaster in place of Mr. J. C. McMillen, resigned.

Cleveland & Marietta.—The officers of this company are: President and Manager, A. T. Wikoff; Directors, F. W. Ellis, M. K. Jesup, J. K. Nash, A. J. Warner.

Concord & Portsmouth.—This company, whose road is leased to the Concord Co., has elected Samuel V. Bell President; Wm. H. Hackett, Clerk; Edward H. Payne, Treasurer.

Cumberland & Pennsylvania.—At the annual meeting in Cumberland, Md., Oct. 11, the following directors were chosen: Charles F. Mayer, D. H. Miller, W. M. Whitewright, Robert Garrett and W. F. Frick.

Dover & Winnipiseogee.—This company, whose road is leased to the Boston & Maine, has elected Wm. Hale President; George W. Benn, Clerk and Treasurer.

Fort Worth & Rio Grande.—Mr. W. B. Parsons, Jr., has been appointed Chief Engineer of the road, with headquarters at Fort Worth, Tex. He retains his connection with the New York District Railway and his office at 35 Broadway.

Little Rock & New Orleans.—The directors of this company are: George M. Barber, George D. Foster, James S. Smith, Beebe, Ark.; C. T. Lewis, M. J. Tooter, Chicago. The place of business will be Beebe, Arkansas.

Louisville, Evansville & St. Louis.—The officers of this company as consolidated are: President, Wm. T. Hart, Boston; General Manager, George H. Evans, Louisville, Ky.; directors, Isaac T. Burr, W. S. Blanchard, J. M. Felter, Jonas T. French, John Goldsmith, A. P. Humphrey, H. B. Hyde, C. H. Patton, Thomas Scott.

Metropolitan (of Philadelphia).—The officers of this company are: President, William A. Ingham; Directors, John Lucas, J. W. Jones, John J. Deery, James G. Lindsay, George Gerry White, Frederick Prime, Jr., Charles F. King, Samuel G. De Coursey.

Michigan Central.—Mr. W. L. Benham has been appointed Assistant General Freight Agent in the place of Mr. A. Patriarch, Division Freight Agent, resigned. Headquarters, Bay City, Mich. Mr. Thomas Edson has been appointed Freight Accountant and Freight Claim Agent, with office in Detroit, Michigan.

Missouri Pacific.—General Superintendent Kerrigan has issued the following circular: "The following changes and transfers will take effect Oct. 1, 1886: Mr J. Herrin, Superintendent of the lines in Texas, is transferred to the St. Louis, Iron Mountain & Southern Railway, with headquarters at St. Louis, and will assume charge of that road. Mr. H. G. Fleming, Superintendent of the St. Louis, Iron Mountain & Southern Railway, is transferred to Texas, with headquarters at Palestine, and will have charge of and operate the lines of this company in Texas. Their orders will be obeyed accordingly."

Mobile & Ohio.—The following appointments have been announced by General Manager Talcott: Sumner Hopkins, General Freight Agent, headquarters Mobile; J. L. G. Charlton, General Passenger Agent, headquarters St. Louis, both vice J. C. Wallis, General Freight and Passenger Agent, resigned, and both under the direction of the General Traffic Manager, H. S. Depew, who has been appointed with headquarters in St. Louis; M. Sweeney, Superintendent of Transportation, headquarters St. Louis; J. N. Seale, Master of Trains, Mobile Division. The office of Master of Transportation has been abolished.

Ogdensburg & Lake Champlain.—Mr. F. W. Baldwin has been appointed Superintendent in place of Mr. E. J. Chamberlin, transferred to the Canada-Atlantic road. Mr. Baldwin formerly held a position on the Central Vermont, but lately has been Assistant Superintendent of the Mexican National Railway at Laredo, Texas.

Pennsylvania.—Mr. C. F. Beaune has been appointed Emigrant Agent at Philadelphia, in place of Mr. Francis Funk, deceased. Mr. Braune is succeeded as Agent at New York by Mr. John C. Haberstroth.

Richmond & Allegheny.—The following circular has been issued: "Mr. M. Sweeney having resigned to accept a position on another road, the following appointments and changes were made, to date from Oct. 1:

"Mr. A. D. Rethard is appointed Superintendent of Transportation, and as such will have immediate charge of station, train and car service. The offices of Trainmaster and Car Accountant are abolished. Reports and correspondence heretofore addressed to those offices will in the future be sent to the Superintendent of Transportation.

"Mr. W. A. Crawley is appointed Supply Agent, and as such is charged with the purchase of all material, including fuel, required by the Receivers in operating the road.

"Mr. J. A. Briggs has been appointed Tie Inspector, and will report monthly to the Supply Agent.

"The General Freight Agent will have immediate charge of the commercial coal business. All correspondence regarding coal, other than that required for the use of the railroad, will be addressed to that officer."

Richmond & Danville.—Col. John N. Staples, of Greensboro, N. C., is appointed Assistant General Counsel of the company.

St. Louis & San Francisco.—The following circular was issued by General Manager H. L. Morrill on Oct. 11: "Mr. D. H. Nichols is appointed General Superintendent of this company, with office at North Springfield, Mo. He will have general charge and supervision of all business in the Transportation and Machinery departments, and will report to the General Manager.

"The office of Superintendent of Transportation is abolished, and its duties will be performed by the General Superintendent.

"Mr. F. P. Wherry, in addition to his duties as Secretary to the General Manager, is appointed Purchasing Agent for this company, with office at St. Louis."

Union Pacific.—Mr. John Rapelje has been appointed Assistant Superintendent of the Colorado Division, with headquarters at Denver. His jurisdiction will extend over all the narrow-gauge lines, except the Greeley, Salt Lake & Pacific between Sunset and Boulder. Mr. J. E. Hutchinson has been appointed Train Dispatcher at Denver.

Waldo & Lake City.—The directors are: C. K. Dalton, Ned E. Farrell, John B. Johnston, Samuel J. Kennard, F. S. Lewis, R. A. Peck, George C. Rixford, Wm. Weeks. Mr. Ned E. Farrell is Chief Engineer, with office at Waldo, Florida.

Western Union Telegraph.—At the annual meeting in New York, Oct. 13, the old board was re-elected, with three exceptions. The new directors were Austin Corbin, Henry B. Hyde and John G. Moore, in the place of Harrison Durkee, Hugh J. Jewett and Frank Work.

Wyandotte, Kansas City & Northwestern.—Mr. Samuel W. Clapp is appointed Chief Engineer, with office in Wyandotte, Kan., in place of W. B. Knight, resigned.

PERSONAL.

—Mr. John M. Rose has resigned his position as General Freight and Passenger Agent of the Cape Fear & Yadkin Valley road.

—Mr. M. Sweeney has resigned his position as Superintendent of Transportation of the Richmond & Allegheny road, to accept a position on another line.

—Mr. L. B. Beardsley has resigned his position as Assistant Superintendent of the Chicago & Council Bluffs Division of the Chicago, Milwaukee & St. Paul road.

—Mr. S. F. Woods, Assistant Master Mechanic of the International & Great Northern Division of the Missouri Pacific, died at his residence in Palestine, Tex., Oct. 7.

—The purchasing bondholders of the Toledo, Cincinnati & St. Louis road, at a recent meeting in Boston, passed resolutions conveying their thanks to Mr. James M. Quigley, for his services in the reorganization of the company.

—The Cleveland (O.) *Leader* reports that Mr. John Mackenzie has resigned his position as Superintendent of Motive Power of the New York, Chicago & St. Louis road, to take effect Nov. 1.

—Col. James C. Duane has been appointed Chief of Engineers of the United States Army in place of Gen. John Newton, retired. Col. Duane's service has been entirely in the army, as he has been an officer in the Engineer Corps ever since he graduated from West Point in 1848.

—Mr. Henry C. Barlow, who has been for some time past Traffic Manager of the Mexican Central road, with headquarters in Chicago, has resigned that position. Mr. Barlow's special work has been to develop the freight business between the Western states and Mexico, and in this he has had much success.

—Mr. Robert T. Baldwin, President of the National Mechanics' Bank of Baltimore, died in that city Oct. 8. Mr. Baldwin was a prominent banker and citizen of Baltimore, and was largely interested in the Baltimore & Ohio road. He was also connected with the Virginia Midland, and took a leading part in the reorganization of that company.

—Mr. Frederick Capreol died in Toronto, Ont., Oct. 11, aged 84 years. He was the first projector of the Northern Railroad of Canada, and the preliminary surveys for that line were made entirely at his expense. For many years past Mr. Capreol has been prominent as an advocate of the construction of a canal between Lake Ontario and Georgian Bay.

—Mr. George F. Brydon died in San Diego, Cal., Oct. 8. Mr. Brydon was for a number of years connected with the passenger department of the Ohio & Mississippi road, and was for some time Chief Clerk. Last March he accepted the position of Assistant General Passenger Agent of the Atlantic & Pacific road, hoping that a residence in California would benefit his health.

—Ex-Senator David Levi Yulee, of Florida, died in New York, Oct. 9, aged 75 years. Mr. Yulee was best known as a member of Congress and Senator from Florida, but he was also one of the early movers in the early railroad building in that state. He was a director and president of several of the minor companies which were afterwards united in the Florida Railway & Navigation Co., and was the chief builder of the old Jacksonville, Pensacola & Mobile road.

—Mr. Reuben Wells, who went to the Louisville & Nashville road some years ago as Superintendent of Motive Power, but was subsequently appointed General Manager and afterward Assistant to the President, has gone back to his old position and is now Superintendent of Motive Power again, as noted briefly last week. Mr. Wells is widely known as a master mechanic of ability and wide experience and as one of the leaders of the Master Mechanics' Association from its beginning.

—Mr. Jason H. Carpenter died in Cincinnati, Sept. 15, after a brief illness. Mr. Carpenter was 42 years old, and at an early age entered the service of the Chicago, Milwaukee & St. Paul Co., as clerk in the freight department, and was subsequently made Traveling Auditor. In 1873 he

went to the Chicago & Northwestern as Traveling Freight Agent, and was subsequently Purchasing Agent of that road. After a short term of service with the Boston, Barre & Gardener road he was, in 1883, made General Freight Agent of the Boston, Concord & Montreal. In 1884 he left that road to become General Freight and Passenger Agent of the Chicago & West Michigan, and resigned that position in July last to take the management of some iron works in Cincinnati.

—Mr. George W. Lowe having resigned his position as Master Mechanic of the Mahoning Division of the New York, Pennsylvania & Ohio road, the locomotive engineers of the division adopted the following resolutions as a testimonial of their regard :

"*Resolved*, That it is with sincere regret we learn of the resignation of Mr. Geo. W. Lowe, our Master Mechanic. Although but a short time among us, he has, by just and courteous dealing, won the esteem and goodwill of the engineers on the Mahoning Division, New York, Pennsylvania & Ohio Railroad, and by his universal kindness to all, and his straightforward, gentlemanly business manner established for himself a warm place in the hearts of all employés in the motive power department of the Mahoning Division.

"Be it further *resolved*, That a copy of these resolutions be printed in the *Railroad Gazette*, and a certified copy be sent to Mr. Lowe's address."

—Mr. Jesse L. Williams died at his residence in Fort Wayne, Ind., Oct. 9, aged 79 years. Mr. Williams was born in North Carolina, but went to Indiana while still a boy. He became a civil engineer, and in that capacity was first employed on the surveys of the Miami & Erie Canal, from Cincinnati to Lake Erie. After some years' service there, he was made State Engineer, but subsequently went to Indiana, where he was employed on the surveys of the old Wabash & Erie Canal. In 1830, when only 29 years old, he was appointed Chief Engineer by the State Board of Internal Improvements, having charge of all the public works then projected by the state. In 1854 he was appointed Chief Engineer of the Fort Wayne & Chicago Railroad and had charge of the construction of that line. When it was consolidated with the Ohio & Pennsylvania and became the Pittsburgh, Fort Wayne & Chicago he was chosen a director of the consolidated company and has held that position ever since. Mr. Williams also served for a number of years as a Government director of the Union Pacific. He retired from business a number of years ago and has since resided in Fort Wayne, occupying his time in the supervision and care of an extensive estate which he had accumulated. He leaves a wife and threesons.

TRAFFIC AND EARNINGS.

Coal.

Anthracite coal tonnage for the week ending Oct. 2 was 697,933 tons. The total tonnage for the nine months to Oct. 2, as given by the weekly reports of the companies, was 22,863,348, against 22,042,884 last year; an increase of 840,464 tons, or 3.8 per cent.

The anthracite trade at present is very active, and prices are well maintained, the market taking up readily all the coal coming forward.

There seems to be a general expectation that the proposed legal action against the anthracite combination in Pennsylvania will not result in anything.

Bituminous coal tonnages for the nine months to Oct. 2 are reported as follows :

	1886.	1885.	Inc. or Dec.	P.c.
Cumberland, all lines..	1,755,957	2,079,673	D. 323,716	15.6
Hun. & Broad Top	283,856	115,671	I. 168,185	145 4
Barclay R. R..... ..	141,999	179,547	D. 37,548	20 9
Beech Creek...	726,652	547,474	I. 179,178	30.9
Pennsylvania R. R :				
Clearfield.	1,572,109	2,176.924	D. 604,815	78.8
Mountain District....	508,832	392,060	I. 116,772	29.8
Penn and Westmore.	889,129	903,510	D. 14 381	1.6
Minor districts'.....	1,058,273	684.936	I. 273,337	34.8
Chesapeake & Ohio....	845.033	766,682	I. 78,351	10.2
Norfolk & Western....	616,738	412,737	I. 204,001	49.4
Total..... ...8,398,578		8,359,214	I. 39,364	0.5

The changes in bituminous tonnage are, as we have heretofore noted, partly due to the strike which for some time stopped production in the Cumberland and adjoining districts, and at the same time stimulated production in the other districts from which the deficiency could be supplied. In part, however, the changes are due to more permanent causes, chief among which is the building of new roads. The Beech Creek road, for instance, has opened some new territory, but it has also taken away some coal business from the Pennsylvania's Clearfield Division.

The increase on the Virginia roads, the Chesapeake & Ohio and the Norfolk & Western, is a permanent growth, and is due to the opening of new territory and the growing appreciation of the good quality of the coal.

Coke tonnages for the nine months to Oct. 2 are reported as follows :

	1886.	1885.	Inc. or Dec.	P. c.
Southwest Penna. R. R....	1,926,570	1,449,713	I. 476,857	32.9
Other districts, Pa. R. R..	602,304	461.166	I. 141,138	30.6
Connellsville, *via* Pa. R. R.	32,833	42,060	D. 9,227	21.9
Total.	2,561,707	1,952,939	I. 608,768	31.2

These tonnages are all over the Pennsylvania Railroad, no other line reporting coke tonnages regularly. The Baltimore & Ohio and the Pittsburgh & Lake Erie both carry large shipments of coke from the Connellsville Region, and a considerable amount is shipped by river from Pittsburgh. The river trade, however, is smaller than it was several years ago.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the nine months to Oct. 2 was :

	1886.	1885.	Inc. or Dec.	P.c.
Coal port for shipment.....	52,393	71,686	D. 19,363	26 9
S. Amboy "	377,664	409,407	D. 31,743	7 8
Local points on N. J. divs..	614,622	602,945	I. 11,677	1.9
Co.'s use " " ..	174.757	166,554	I. 8,203	4.9
Total..... 1,219,336		1,250,592	D. 34,226	2.5

Of the total this year, 1,034,547 tons were from the Lehigh Region, and 184,819 tons from the Wyoming Region.

The actual tonnage passing over the Pennsylvania & New York road for the ten months of its fiscal year from Dec. 1 to Oct. 3 was : anthracite, 1,347,122; bituminous, 150,957; total, 1,498,079 tons.

Pennsylvania Railroad coal tonnage for the week ending Oct. 9 was :

	Coal.	Coke.	Total.	1885.
Line of road.....	145,142	64,088	210,130	182,631
From other lines.....	60.202	921	61,123	79,629
Total....	205.344	65.909	271.253	262,260
Year to Oct. 9..	8,837,846	2,627,616	11,465,462	10,482,069

Increase for the week, 8,993 tons, or 3.5 per cent.; increase for the year, 983,393 tons, or 9.4 per cent.

Cumberland coal shipments for the week ending Oct. 9 were 73,329 tons. Total to Oct. 9 this year, 1,829,286; last year, 2,133,189; decrease, 303,903 tons, or 14.3 per cent.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1886.	1885	Inc. or Dec.	P. c.
Nine months to Sept. 30 :				
Chic. & W. Mich..	$1,030,730	$946 143	I. $84.587	8.9
Cleve., Ak. & Col.	394,744	372,631	I. 22,113	5.9
Col. & Cin. Mid..	232.833	142,437	I. 90,396	63.6
Col., H.Vy. & Tol.	1,701,924	1,707,268	D. 5,344	0 3
E. Ten., Va. & G..	2,949,281	2,890,373	I. 58,908	2.0
Ev. & Terre H....	563,782	538.673	I. 25.109	4.6
Flint & Pere Ma.	1,597,622	1,410.641	I. 186 981	13.3
Ft. Worth & D..	283,636	342.959	D. 59.323	17 3
Grand Trunk.....	12,043.621	10,693,729	I. 1,349,892	12.6
Gulf, Col. & S. F.	1,499,022	1,100,860	I. 398,162	36.2
Illinois Central:				
Ill. lines....	4,791.988	4,704.052	I 87,936	1.8
So. Division.....	2,618,079	2,930,307	D. 312 228	11.0
Iowa lines.....	1,232,400	1,171,468	I. 60,932	5.2
Ind., Bloom. & W.	1,860,123	1,714,149	I. 145.974	8 5
Ind., Dec. & Spr...	306,927	263,514	I. 43,413	16.5
K. C., Clint. & S.	168,969	....	. .....	...
K. C., Ft. S. & G.	1,788,505	1,855,535	D. 67.070	3.6
K. C., Spr & M..	1,074,416	1,128,939	D. 54,.23	4 8
Lake Erie & W ..	940.413	877.989	I. 62.424	7.2
Lehigh & Hudson	156.679	128,753	I. 28.926	22.4
L., N. A. & Chic..	1,337.943	1,194 267	I. 143,676	12.0
Marq., H. & O..	774,192	640.751	I. 134,441	21,9
Mem. & Charles..	929.276	891,907	I. 37,369	4 2
N. Y. Cen. & H. R.	23.620 611	17,619,272	I. 6,001,339	34 1
N. Y. City & No.	400,077	321,812	I 78.265	24 3
N., Y. Ont. & W..	991.789	933.237	I. 58,053	6.2
Ohio Southern....	360,944	324.946	I. 35.998	11.1
Rich. & Danville:				
Rich. & D. Div...	2 866.224	2.823,845	I. 42,379	1.5
Va. Mid. Div...	1,128,933	1,141,190	D. 12,257	1.1
West. N. C. Div.	391,269	345,246	I. 46 023	13.3
South Car. Div..	535.392	561,415	D. 26.023	4.6
Col. & Gr. Div..	410,164	454,161	D. 43 997	9.4
St. Jo. & Gd. I..	837,618	772,304	I. 65 314	8.5
St. L., A. & T. H.:				
Main Line.....	917,254	924,495	D. 7,241	0 8
Belleville Line..	527 086	537,920	D. 10.834	2 0
St. L., Ark. & T...	1,176,913	786.159	I. 390.774	49.7
Texas & Pacific...	3,956,251	3,568,598	I. 387,653	10.8
Wisconsin Cent...	1.073,358	1,065,132	I. 8,226	0.8
Eight months to Aug. 31 :				
Bur., C. R. & No.	$1,721.803	$1,864,123	D. $142,320	7 6
Net earnings...	381.606	479.729	D. 98,123	20.4
Cape F. & Y. Vy.	139 665	129,020	I. 10,645	8.3
Net earnings....	68,040	56,640	I. 11 400	20 1
Ches. & Ohio.....	2,636,293	2,145.826	I. 490,467	23 3
Net earnings ..	776,119	566,522	I. 209.597	37.0
Ches., O. & S. W..	1.025.086	970.024	I. 55,062	5.7
Net earnings...	347,859	283,064	I. 64.795	22.9
C., I., St. L. & C..	1,652 681	1,533,561	I. 119.120	7 8
Net earnings ..	640.618	537.168	I. 103.450	19.3
Des. M. & Ft. D..	203 760	226.395	D. 22,635	10 0
Net earnings...	30.941	53 035	D. 22,094	41.7
Eliz., Lex. & B. S.	580,349	436.990	I. 143,359	32.8
Net earnings....	197.418	147,973	I. 49 445	33 4
Ft. Worth & D...	242 636	303.282	D. 60,646	19 9
Net earnings...	9 .,159	129,481	D. 39,322	30.5
Hous. & Tex. C..	1,538,301	1,234,161	I. 304,140	24.6
Net earnings...	96,764	50.093	I. 46,671	93.3
Month of July :				
Central Pacific...	$1.457.079	$1,370.208	I. $86,871	6.3
Net earnings....	827,337	858.499	D. 30,962	3.6
Month of August :				
Bur., C. R. & No.	$246.435	$225,824	I. $20,611	9.1
Net earnings...	67.594	53,249	I. 14,345	27.1
Cape F. & Y. Vy.	20 248	17,152	I. 3,096	18.2
Net earnings...	10,886	9 693	I. 1,193	12.3
Ches. & Ohio....	410.966	299.198	I. 111,768	37.3
Net earnings...	137,329	107.700	I. 29.629	27 4
Ches., O. & S. W.	147 399	136.721	I. 10.678	7 5
Net earnings...	59.907	53,630	I. 6,277	11.6
C., I., St. L. & C.	236.482	206,850	I. 29,632	14.3
Net earnings....	97,887	89,841	I. 8,046	8 9
Des M. & Ft. D...	28,850	27,780	I. 1,070	3 8
Net earnings...	6.610	7 975	D. 1,365	17.1
Eliz., Lex. & B. S.	91,928	62 932	I. 28,996	44.6
Net earnings ..	36,174	28,833	I. 7,341	25.3
Ft. Worth & D...	37,599	43,648	D. 6 049	14.1
Net earnings...	15.726	18,064	D. 2,338	13.0
Hous. & Tex. C...	246 728	240.467	I. 6,261	2 6
Net earnings...	82.560	54,293	I. 28,267	52.3
Minn & N. W....	54 804	... .	.....	....
Net earnings....	18.703	... .	.....	....
Oregon Imp. Co..	317,045	275 603	I. 41.442	15.0
Net earnings...	117,450	68.332	I. 49,118	72.1
Month of September :				
Chi. & W. Mich..	$128,594	$116,809	I. $11,785	10.1
Cleve., Ak. & C...	51,721	49.370	I. 2,351	4.8
Col. & Cin. Mid..	34,426	25,585	I. 8 641	33.2
Col., H.Vy. & Tol.	232,891	231,996	I. 895	0 4
E. Ten., Va. & G.	389,157	370,828	I. 18,329	4 9
Ev. & T. Haute..	65,106	68,470	D. 3,364	4 9
Flint & Pere Mar.	178,428	167,754	I. 10,674	6.0
Ft. Worth & Den.	41,000	39 677	I. 1.323	3.3
Grand Trunk.....	1,527,102	1,298.603	I. 228.499	17.4
Gulf, Col. & S. F..	217,090	211,163	I. 5,837	2.8
Illinois Central:				
Ill. lines	638 754	615,665	I. 23,089	3.7
South. Div.....	287.274	318,564	D. 31.290	9.9
Iowa lines..... ..	182,591	167,288	I. 15.303	9.2
Ind., B & W.....	253,363	242 461	I. 10,902	4 5
Ind., Dec. & Spr..	38,357	36,799	I. 1,558	4.2
K. C., Clint. & S.	18 474	.....	.....	...
K. C., Ft S. & G.	211.553	226.230	D. 14.677	6 5
K. C., Spr. & M....	134,553	106.776	I. 27,777	25.9
Lake Erie & W....	123.949	121.415	I. 2,534	2.1
Lehigh & Hudson.	18.306	17.481	I. 825	5.0
Lou., N. A. & C...	190,593	161,272	I. 29,321	18 2
Marq., H. & Ont.	117,639	117,198	I. 441	0.4
Memphis & Chas.	119,432	108,221	I. 13.211	12 4
N. Y. C. & H. R..	3,049,400	2,437,667	I. 611,733	25.1
N. Y. City & No..	47.284	42.391	I. 4.893	11 6
N. Y., Ont. & W.	129,483	123,675	I. 5,808	4.7
Ohio Southern....	53,101	59,074	D. 5,973	10.1
Rich. & Danville:				
R. & D. Div....	366,327	373 033	D. 6.706	1.8
Va. Mid. Div...	168,240	167,304	I. 936	0.6
West. N. C. Div.	56,641	45,866	I. 10,775	23.4
South Car. Div.	58,567	80,150	D. 21,583	26.9
Col. & Gr. Div.	40,720	63.400	D. 22,680	35.8
St. Jo. & Gd. I....	104,296	113,454	D. 9,158	8.1
St. L., A & T. H.:				
Main Line.....	132.886	137,545	D. 4,663	3.4
Belleville Line..	76,900	75,309	I. 1.591	2.1
St. L., Ark. & T...	162.636	156,454	I. 6,182	3.9
Staten Id.....	91.213	74,160	I. 17.053	23 0
Texas & Pacific...	571,800	465.000	I. 106,800	23.9
Tol. & Ohio Cent.	75.827	64 788	I. 11,039	17.0
Wisconsin Cent...	131.324	122,950	I. 8,374	6.8
First week in October :				
Buff., R. & Pitts.	$31.508	$26,913	I. $4,595	17.0
Cairo, V. & C.....	13,117	8 688	I. 4,429	50.9
Canadian Pacific.	221,000	182.000	I. 39.000	21.4
Central Iowa.....	32 390	31,400	I. 990	3.2
Chic. & Alton....	187,885	184 558	I. 3,327	1.8
Chi. & East. Ill..	44,502	40.719	I. 3,783	9.2
Chi., Mil. & St. P.	623,000	590,359	I. 33,641	5.7
Chic. & N. W....	645.900	645.700	I. 200	...
C., St. P., M. & O.	143,300	139,000	I. 4,300	3.1
C., I., St. L. & C.	60 953	50,620	I. 10,333	19.8
Den. & R. G.....	141,530	141,436	I. 94	0.1
Illinois Central...	240,300	225,036	I. 15,264	6.8
Iowa lines.	46.400	41.963	I. 4.437	10.5
Louisv. & Nash..	307,215	276,240	I. 30 975	11.2
Mil., L. S. & W..	57,913	32,295	I. 25,618	7.8
Mil. & Northern..	12,716	11,542	I. 1.174	10.2
Norfolk & West..	81 431	62,261	I. 19.070	30.7
St. L. & San F...	117,100	104,700	I. 12.400	11.8
Wab., St. L & P..	288,000	270,000	I. 18,000	6 7

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Chicago Shipments Eastward.

The Board of Trade reports east-bound shipments from Chicago for the week ending Oct. 9 as follows, in tons, the report including local as well as through shipments :

	Tons.	P.c.		Tons.	P.c.
Chi. & Gd. Trunk...	5,152	11.8	Pitts., Ft. W. & C..	4 5•9	10.4
Mich. Central	6,581	15.1	Chi., St. L. & Pitts.	7.800	17 9
Lake Shore . ..	8 748	20 1	Balt. & Ohio.....	2.008	4.6
N. Y., Chi. & St. L..	5.790	13 3	C. Ind., St. L. & C..	2.948	6 8

The total shipments were 43,556 tons, against 36,122 in the preceding week; an increase of 7,434 tons, or 20.6 per cent.

Cotton.

Cotton movement for the month ending Oct. 8 is reported as follows, in bales :

	1886.	1885.	Inc. or Dec.	P.c.
Interior markets :				
Receipts.....	138,121	124,113	I. 14 008	11.3
Shipments.....	99,200	106,510	D. 7,310	6 8
Stock, Oct. 1.....	111,575	89,785	I. 21,790	24.2
Seaports :				
Receipts..	197,166	192,107	I. 5,059	2.6
Exports	89.516	92,335	D. 2.819	3.1
Stock, Oct. 8.....	407,179	390,390	I. 16,789	4 3

The total movement from plantations for the crop year to Oct. 8 is estimated at 701,611 bales, against 753,080 last year, 722,243 in 1884 and 878,859 in 1883.

The *Chronicle* gives the following statement, showing the total amount of cotton marketed in September, the first month of the crop year :

	1886.	1885.	1884.
Receipts at the ports to Oct. 1 (bales).	359,203	385,642	345.445
Net shipments overland same time....	19,635	22,910	12,391
Total receipts (bales)....	378,838	408 552	357,836
Southern consumption since Sept 1...	32.000	29,000	28,000
Total to Oct. 1 (bales).	410,838	437,552	385 836
Interior stock in excess of Sept. 1.....	24,000	48,000	28,000
Total in sight (bales)	434,838	485 552	413,836

"This indicates that the movement during September of the present year is 50,714 bales less than in 1885 and 21,002 bales greater than in 1884."

Chicago Traffic Notes.

The Chicago East-bound Freight Committee last week considered a number of changes in classification.

A meeting of the Louisville Committee was held in Chicago last week, when arguments for a new division of traffic were submitted to the Arbitrator.

The numbers of cars weighed by the Western Weighing Association (Chicago) in September was :

	1886.	1885	Increase.	P. c.
No. cars weighed..... ...73,144		67,121	6,023	9.0

This is perhaps the best single indication of the sales of Chicago to the country west of it. In August 67,618 cars were weighed.

Sault Ste. Marie Canal.

The September report shows that the commerce in the Sault canal that month was greater than ever. During September the locks were in operation 359½ hours, and there passed through the canal 635 steam vessels, 383 sailing craft and 41 rafts and other craft, a total of 1,059 for 584 lockages. The registered tonnage aggregated 624,072 tons and freight tonnage 695,901 tons, the total of passengers carried being 3,259. In addition to the freight tonnage enumerated two rafts measuring 4,000,000 ft. passed over the rapids. In comparison with the corresponding month last year the registered and freight tonnage shows an increase of 92,383 and 142,090 respectively, but there is a falling off of 867 in the number of passengers carried.—*Marquette Mining Journal.*

Northwestern Traffic Association.

A meeting of the general managers of the roads interested in this Association began in Chicago, Oct. 12. On the first day it was decided to form a pool on west-bound business, and a committee was appointed to arrange the details.

On Oct. 13 the meeting decided to form a general pool on all east-bound traffic from Northwestern points except grain and flour. The pool is to last for one year, 90 days' notice of withdrawal being required.

The question of a pool on flour and grain, which form much the larger part of the Northwestern business, was left for future consideration.

Traffic Notes.

In Chicago, Oct. 7, the Railroad Commissioners closed their hearing on the live stock question, and gave their opinion that dressed beef should be made fourth class instead of third class freight.

The earnings on business in the Central Iowa Traffic Association in September were: East bound, $2,917; westbound, $45,845; total, $48,762.

At a meeting held in Chicago, Oct. 7, the Southern Passenger Traffic Association decided to adopt last year's rates for laborers' tickets from Chicago to Southern points. It was decided to ask the Southern Passenger Committee to reconsider its action withdrawing round-trip Florida tickets.

Indianapolis Car Movement.

The number of cars received and forwarded at Indianapolis has been :

	Week ending.				
	Sept. 11.	Sept. 18	Sept. 25.	Oct. 2.	Oct. 9.
1886—Total.....	21,113	21.198	22,391	22.488	
Loaded ...	17,123	18,546	18,648	18,701	19.857
1885—Total.....	.... .	.. ...	21.240	23,996	.....
Loaded ...	15,567	.....	18,602	19,107	18,380

The movement continues large, both in east-bound and west-bound business. Nearly all the lines report an increase in traffic.

Central Traffic Association.

At the meeting to be held in Chicago, Oct. 20, the subjects to be considered are the following :

1. The unfinished business of the New York meeting.
2. The report of the committee on freight percentages.
3. To receive the report of the committee on new contract points.
4. A re-division of the expenses called for by various companies.
5. The progress of the passenger pools.
6. The situation as to freight and passenger rates.
7. The enforcement of actual weights on live stock.
8. To receive the report of the committee appointed to report upon a division of the duties between Commissioner Fink's office and this office.
9. To receive the report of the committee on the subject of a revision of the contract for the organization of the association.
10. To approve the proceedings of the executive committee.
11. Any question pertinent to the business and purposes of the association which may be presented by its members.

A meeting of the Passenger Department of the Central Traffic Association, to be held in the Association rooms, Chicago, is called for Tuesday, Oct. 19, at 10 a. m. The following matters will be presented for consideration in their proper order :

1. It is claimed that some lines not members of this Association are not selling continuous passage tickets for transportation between differential fare points, and the rules of the Central Traffic Association require its members to use continuous passage tickets for such business.

2, Shall uniform rates be charged by all lines for the transportation of detachments of U. S. troops between points where differential fares are used for regular business?

3. What basis shall be adopted for computing theatrical fares between Central Traffic Association points where differential fares are used for regular business?

4. Nomination of an Arbitrator to succeed Mr. E. P. Wilson, resigned.

5. Payment of commissions in Trunk Line Territory.

6. Amendments to rules.

Saginaw Lumber Shipments.

Shipments of lumber from the Saginaw River from the opening of navigation to Oct. 1 have been for nine years in millions of feet:

1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
401	489	624	597	657	597	620	507	469

Thus the shipments this year were 7¼ per cent. less than last year, 24 per cent. less than in 1884 and the smallest since 1878.

RAILROAD LAW.

Power to Lay Track on Public Street.

In the case of Mish and others against the Pennsylvania Railroad Co., the Pennsylvania Supreme Court has given its decision. Under the charter of the Portsmouth & Lancaster Railroad and supplements thereto (a leased line of the Pennsylvania Railroad), the latter corporation constructed about 1,000 ft. of track as a branch line or switch over the bed of Brown street, Middletown, Pa. Mish and other property owners on the line filed a bill in equity in the Common Pleas Court of Dauphin County, averring special damages and denying the right of the Pennsylvania Railroad to occupy the public streets of a borough with its tracks under charter powers of its leased line. The Common Pleas Court granted an injunction and ordered the company to remove the tracks. An appeal was taken, and the judgment of the lower Court is now affirmed. The opinion reviews all the charters in question and holds that no express power is given in the charters in question for the laying of track upon a public highway. Not being expressly given, no such power exists.

OLD AND NEW ROADS.

Annapolis & Baltimore Short Line.—The track on this line is now laid from a junction with the Baltimore & Ohio at Clifford, 6 miles from Baltimore, southwest to the Severn River near Annapolis. The track from the Severn into the city of Annapolis, about 1½ miles, will be ready as soon as the bridge over the river is completed, and it is expected that the road will be running about Dec. 1. The new line is much more direct than the existing road between Baltimore and Annapolis, and passes through a very good country.

Arkansas & New Orleans.—This company has filed articles of incorporation to build a railroad from Arkansas Post, Ark., southward to Monroe, La., a distance of 115 miles.

Astoria & Tillamook.—This company has been organized to build a railroad from Astoria, Ore., to the Seaside House, and thence to the Nekenakin and Nehalem valleys to Tillamook. Besides developing the country the road is intended to accommodate seaside travel, and also to transport building stone for the government works now in progress at the mouth of the Columbia River. It is proposed to build at once the section of 15 miles from Astoria to the quarries

Atchison, Topeka & Santa Fe.—This company has issued a circular to subscribers to the blocks for building the Southern Kansas Extension across the Indian Territory, announcing that the Atchison, Topeka & Santa Fe Co. finds very important advantages can be obtained by having that portion of the new Southern Kansas branch which will be located in the Pan Handle of Texas built by a Texas corporation. An auxiliary corporation called the Southern Kansas Railway Co. in Texas is accordingly being organized under the laws of the latter state for the purpose of building this portion of the line, which, when completed, will be leased to the Southern Kansas Co.

This arrangement will necessitate the issuing of different first mortgage bonds upon the two portions of the line; and in order that its subscribers may have no reason to complain that the securities received by them are less valuable than those announced in the original circular (No. 58) the Atchison Co. has decided to guarantee the payment of the principal and interest of all the first mortgage bonds to be issued to subscribers under that circular, both the first mortgage Gulf Division bonds of the Southern Kansas Co. and the first mortgage bonds of the Southern Kansas Co. in Texas.

The Chicago, Kansas & Western Co., which is building the new extensions of this road in Kansas, has filed amended articles of incorporation covering a number of additional lines in Kansas.

Mr. C. H. Venner, who has made himself somewhat prominent by his opposition to the management of this company, has issued a circular to stockholders, protesting against the present management and against the extension of the company's system into Texas. Mr. Venner claims that the company has received nothing but injury from all its lines outside of Kansas, and that the profitable portions of its system have been drawn upon to support the extensions in New Mexico and Arizona.

Atlanta, Mississippi & Atlantic.—At a public meeting held in Atlanta, Ga., Oct. 11, it was resolved to organize a company to build a railroad from Atlanta west to Sheffield, Ala., and east to Waynesboro, Ga., the line to be extended from Waynesboro to the ocean at Savannah, Port Royal or Charleston. The length of the projected line from Waynesboro through Atlanta to Sheffield is about 350 miles. A committee, consisting of Messrs. Joel Hurt, H. T. Inman, H. B. Tompkins, H. W. Grady, Howard E. W. Palmer and George W. Scott, was appointed to secure a charter and take other necessary steps toward organizing a company.

Baltimore & Ohio.—Reports are current that this company is making arrangements for the extension of its Valley Division from the present terminus southward, through Salem, Va., to the Canberry Iron Mines in North Carolina, and thence to Chattanooga, Tenn., and a connection with the roads running to Mobile and New Orleans. No official statement in relation to the reported extension has been made, and the report does not seem to be a probable one.

At the monthly meeting of the board in Baltimore, Oct. 13, President Garrett stated that the gross earnings for the half-year ending Sept. 30 showed an increase of $1,304,182 over the corresponding period of last year. The board voted to declare semi-annual dividends of 4 per cent. on the Main Stem stock, and 5 per cent. on the Washington Branch stock.

Canadian Pacific.—The officers of this company, it is stated, have about completed arrangements for the establishment of a steamship line from the Pacific terminus at Vancouver to China, and negotiations are also in progress for the establishment of another line to Australia.

Carolina Central.—On the extension of this road to Rutherfordton, track is now laid to Ellenboro, N. C., 10 miles west of the old terminus at Shelby, and 64 miles from Charlotte. The first train ran through to Ellenboro this week

Central Pacific.—The following statement for the month of July is published:

	1886.	1885.	Inc or Dec.	P.c.
Earnings	$1,457,079	$1,370,208	I $86,871	6.3
Expenses	629,542	511,709	I 117,833	23.0
Net earnings	$827,537	$858,499	D $30,962	3.6

The total charges for the month this year were $582,973, leaving a net surplus of $244,564.

Chicago, Burlington & Northern.—The opening of this line for passenger traffic through to St. Paul has been postponed from Oct. 17 to Oct. 31. The change has been caused by the fact that the new passenger and sleeping cars will not be ready in time for the opening of the road on the earlier date.

Chicago, Cairo & Great Southern.—This company has filed amended articles of incorporation in Illinois, providing for the construction of a railroad from Chicago to Cairo.

Chicago, Milwaukee & St. Paul.—The Elkader Branch of the Iowa & Dakota Division has been completed to the town of Elkader, Ia., 5 miles beyond the late terminus at Stulta, and 19 miles from the main line at Bula.

Chicago, St. Louis & Pittsburgh.—Contracts were to have been let this week for the grading of a branch 21 miles in length, from Maplewood, O., to a point near Hamilton. This branch has been talked about for some time and is intended to complete a new line, under the control of the company, between Chicago and Cincinnati.

Cincinnati & Eastern.—The Court of Common Pleas has confirmed the recent sale of this road under foreclosure, and ordered the remaining installments of the purchase money to be paid by March 1 next.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company's statement for August is as follows:

	1886.	1885.	Increase.	P.c.
Earnings	$236,482	$206,850	$ 9,632	14.3
Expenses	138,595	117,009	21,586	18.5
Net earnings	$97,887	$89,841	$8 046	8 7
Fixed charges	50.000	50.000	.....	...
Surplus	$47,887	$39.841	$8 046	20 1
Surplus for July	35,484	16,673	18 811	112 6
Total, 2 months	$83,371	$56,514	$26,857	47.5

This road continues to show a large increase, both in gross and net earnings, over last year.

Dayton & Ironton.—The statement of this company for July is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings	$17 844	$15,281	I. $2,563	16.8
Expenses	15,140	12 485	I. 2,655	21.2
Net earnings	$2,704	$2,796	D. $92	3.1
Interest, etc	1.816	1,090	I. 726	66.7
Surp'us	$888	$1.706	D. $818	48.1

The earnings are still very light, having been, for July of this year, $107 gross and $16 net per mile of road operated.

Entawville.—The track on this road is now laid to a point 7 miles beyond the late terminus at Vance's Ferry, S. C., and 30 miles from the junction with the South Carolina Railroad. The grading is completed 4 miles further, to Elloree

Georgia Midland & Gulf.—Work on this road is progressing well, and it is hoped that all the grading from Columbus, Ga., to Griffin will be furnished by Dec. 1. The tracklaying is advancing as fast as the construction of the bridges and trestles will permit. Work has been begun on the piers for the bridge over Flint River. From the Flint River to Griffin, 26 miles, there are no trestles or bridges. The location of the line from Griffin to McDonough is now in progress and will soon be completed. Two locomotives and a number of flat cars are on the road for use in construction.

Georgia Pacific.—It is reported that negotiations are in progress for the sale of the controlling interest in this road, now owned by the Richmond & West Point Terminal Co., to the Illinois Central Co. Should the sale be made, it is said that the road will be at once extended from Columbus, Miss., westward to a connection with the Illinois Central's Aberdeen branch.

Grand Trunk.—This company's statement for August and the two months from July 1 to Aug. 31 is as follows:

	August.		Two months.	
	1886.	1885.	1886.	1885.
Earnings	£305,343	£251,677	£610.847	£507.793
Expenses	215,349	200.241	426.717	397.881
Net earnings	£89.994	£51 436	£184.130	£109 912

For the two months the gross earnings increased £103,054, or 2.3 per cent., and the expenses £28,836, or 7.2 per cent., leaving a gain of £74,218, or 67.6 per cent., in net earnings.

The earnings of the controlled lines west of Detroit for the two months were:

	C. & G. T.		D., G. H. & M.	
	1886.	1885.	1886.	1885.
Earnings	£105 458	£86,233	£47, 95	£40,617
Expenses	81,556	74,424	28,489	27,630
Net earnings	£23,893	£11,809	£18,806	$12,987

The Chicago & Grand Trunk shows an increase in gross earnings of £19,225, or 22.3 per cent., and in net earnings of £12,084, or 102.4 per cent. On the Detroit, Grand Haven & Milwaukee there was an increase of £6,678, or 16.4 per cent, in gross earnings, and of £5,819, or 44.8 per cent., in net earnings.

Gulf, Colorado & Santa Fe.—On the extension of the Dallas Branch of this road grading is now completed to Honey Grove, Tex., 80 miles northeast of Dallas, and track is laid for 41 miles. Regular trains have begun to run from Dallas to Farmersville, 27 miles.

On the extension from Fort Worth, Tex., northward into the Indian Territory the grading is now nearly completed to the Red River. The tracklaying has been delayed somewhat by the bridges over the Trinity and the Red River. But the Trinity Bridge is now finished, and a temporary crossing is being put in at the Red River. The tracklaying is in progress at several points. A contract has been let to Jones & Carey, of Fort Worth, to grade 115 miles of road north of the Red River, and a large force will be put on at once.

Kansas City, Memphis & Birmingham.—On the Memphis, Birmingham & Atlantic road, which this company now owns and has made part of its line, track laying is actively in progress, and the rails are laid for 21 miles eastward from the old terminus at Holly Springs, Miss., and for 18 miles westward from Tupelo, Miss., leaving a gap of 21 miles, which, it is hoped, will be closed by Nov. 1.

The location of the line from Tupelo to Birmingham, Ala., is completed, and all of this section, except about 65 miles, is under contract, and the work is being pushed as fast as possible. On all the large cuts and other heavy work a large force is employed, and work is going on day and night. The remainder of the grading was to be put under contract during the present week.

The construction work from Tupelo to the crossing of the Warrior River, 32 miles from Birmingham, is under charge of Capt. A. W. Gloster, principal assistant engineer. This section is divided into three subdivisions, with B. B. Gordon, J. C. Turner and Frank F. Aid, as assistant engineers in charge.

Kansas, Nebraska & Dakota.—Track on this road is now laid to Waverly, Kan., 74 miles northwest from the starting point at Ft. Scott, Kan., and 11 miles beyond the late terminus at Paris.

Louisville, Evansville & St. Louis.—At a meeting held in New Albany, Ind., last week the consolidation of the two companies organized by the purchasing bondholders in Indiana and Illinois was completed, and the road was formally transferred to the new company, which will hereafter operate it.

It is stated that the new company will make arrangements to begin work shortly on the extension from Mt. Vernon, Ill., to East St. Louis, and also on a branch from Tell City, Ind., to Huntingburg.

Manhattan.—At a meeting of the board in New York, Oct. 12, it was reported that the reduction of fare on the Third Avenue line is producing a large increase in travel. The board then resolved to reduce the fare on the Sixth Avenue line also from Nov. 1. After that date the fare on all the elevated lines in New York will be 5 cents at all hours of the day.

The company has issued a circular stating that since the beginning of the operation of the road, in 1872, the road has carried 692,929,878 passengers. The gross receipts were $48,502,420. Passengers carried during the year ending Sept. 30 last, 115,109,591. The daily average number of passengers carried during the year ending Sept. 30, 1886, was 315,369. The greatest number of passengers carried during any one day was 557,114. With existing facilities the capacity of the roads is fully 700,000 passengers per diem. Since the reduction of fares, Oct. 1, average increase per day of passengers, 117,112. Average daily increase in receipts $3,489.

Marietta & North Georgia.—The track on this road is now laid to a point 108 miles from Marietta, Ga., and 7½ miles beyond Toccoa River, leaving only 12 miles of track to be laid to complete the road to its terminus at Murphy, N. C. Nearly all the grading on this 12 miles is completed.

Marquette Houghton & Ontonagon.—The Marquette *Mining Journal* says: "The management of this road has determined to provide more dock room in time for next season's ore shipments, and is now gathering material for the purpose. Dock No. 1, or the 'big dock,' as some call it, will be extended 700 ft., making it the largest ore dock on Lake Superior, or in the world. It will be over 2,400 ft. long, and will have 284 pockets; from the first pocket to the last pocket or outer end of the dock, will be 1,800 ft. G. W. Joslin, Master Builder of the road, will superintend the work of constructing the addition to the dock, and work will be commenced in a short time.

"A large number of piles will have to be driven before the superstructure of the dock can be commenced. As much of the pile driving will be done during the fall as possible, but it is probable that a great deal of it will have to wait until the ice forms, as the least sea will interfere greatly with the work. The dock, as extended, will greatly relieve the strain on the rolling stock of the road during the busy season, as instead of storing ore in the cars in the yards here, more of it can be put on the docks to await the arrival of vessels. This year the M., H. & O. has experienced a great deal of trouble from the non-arrival of vessels; so many cars have been in the yards here at times waiting, that there was quite a scarcity for the mines."

Metropolitan (of Philadelphia).—The Philadelphia *Ledger* of Oct. 8 says: "The Metropolitan Railroad Company, recently incorporated in this state, applied yesterday to Councils for leave to construct an underground railroad to secure rapid transit.

"The company proposes to build a subway from Sixty-third and Market streets to the Market street ferries, passing under the Schuylkill, and around both sides of the Public Buildings; on Broad street, south from Market to Government avenue at League Island, and north on Broad street to the City Line road; on Third street, south from Market to Moyamensing avenue, to Fourth, and thence to Pollock street; on Third street, north from Market to Diamond, and thence to Thirty-third street; on Ridge avenue, from Broad street to Diamond; on Lancaster avenue, from Market to Fifty-second street, thence to Elm avenue, and in the subway to lay two or more tracks.

"The application, which was in the form of an ordinance, provides that the company shall do the work of excavation, constructing tunnels and the railroad in a thorough manner, taking all necessary precautions to prevent damage to property, interruption to travel and interference with sewers and the water, gas and other pipes; to provide sufficient space in the excavations and the subway for sewage and gas and water pipes along the route. It further provides that the work shall not stop or interfere with the supply of water or gas or the sewers and that the company shall substitute new and improved sewers according to the Waring system for the present ones along the route, such substitution and all changes or alterations in the water, gas and other pipes as may be necessary to be made at the cost of the company, new connections to be made before any alterations are begun. It still further provides that the street pavements removed by the company shall be replaced by it with new and improved pavements of asphalt, Belgian blocks or such other material as Councils shall order, and in no case shall the surface of any street upon which there is large traffic be disturbed without the erection of bridges or coverings over the works so as to prevent the interruption of travel. * *

"One of the incorporators said that this was a *bona fide* project, and not a scheme to make money out of the charter or the franchises which the city might give. If Councils were to give the permission without delay the necessary office work could be done by the spring and the road completed between the two rivers within a year. Speaking of details, he said that the motive power would be electricity, and when Councils should give them a hearing they would have present eminent electricians, among them Mr. Edison, to show that this was perfectly feasible. The subway would be constructed of masonry, brick and iron; the cars would be 30 ft. long and accommodate 38 passengers, and the entrance to them would be through doors in their sides. Access to the cars would be from the interior of houses or stations, of which in business portions of the city there would be about four to each mile, and in the residence part of the

route three to the mile, on opposite sides of the streets, for up and down cars."

Mexican Railroad Notes.—The Boston *Herald* says: "The Sinaloa & Durango Railroad of Mexico is now managed by a Mexican named Douglas, and he is rated the most practical superintendent the company has had. His aim is to get results at small cost, and make the most possible for the company out of a poor property. Being a Mexican and alive to the welfare of those whom he was selected to serve, he knows how to treat the Mexicans and to develop the little business which the territory affords. The company's bank-book shows a credit balance of $8,000."

The following notes are from the *Mexican Financier* of Oct. 2:

Coal has been found at a depth of 90 ft. on the land recently purchased on the west side of the Sabinas River, state of Nuevo Leon, by the Southern Pacific Co. The vendor was General Naranjo. The vein is said to be 6 ft. 10 in. deep.

The work of construction on the railroad that is to connect the cities of Toluca and Cuernavaca, capitals of the states of Mexico and Morelos, has commenced. It has been determined that the junction of the lines belonging to said railroad shall be at the town of Tenango. It is said that the road will be in operation by the month of September, 1888.

Governor Mier y Teran, of the state of Oaxaca, gives considerable space in his recent message to the Legislature to the project for a railroad to unite Oaxaca to the railway system of the Republic by a road from the city of Oaxaca to Tehuacan in the state of Puebla. We have previously commended this scheme to the attention of foreign capitalists as promising much better returns than the generality of railway projects here. The state of Oaxaca is one of the most fertile and naturally rich states in the Republic; it is isolated at present from the active centres in the eastern part of the country by lack of railroad facilities, the bestowal of which would give a very great impulse to the development of Oaxacan agriculture and mining.

Minnesota & Northwestern.—On the extension of this road from Hayfield, Ia., to Dubuque, track is now laid from Hayfield southeast, 97 miles. Tracklaying is also in progress from Dubuque northwest, and there remain only 28 miles to be completed. The work is being pushed as fast as possible.

On the company's line from Freeport to Chicago a large force is now employed, and the grading is well advanced. The tracklaying force will be transferred to this end of the line as soon as the Iowa section is completed.

Missouri Pacific.—The Leroy & Caney Valley Branch of this road is now completed and will shortly be opened for business. It is 40 miles long, extending from Leroy, Kan., south by west to Fredonia.

The following official circular has been issued to the stockholders of the Missouri Pacific Co:

"For the purpose of paying for a large amount of additional rolling stock required by the increasing business of the system, and paying for the construction of additional branches now being built, it is proposed to increase the capital stock $4,000,000. This stock will be offered at par to the stockholders, and the money will be called as required by the company. Holders of Missouri Pacific at the close of business on Oct. 16 will be entitled to subscribe for one share of new stock for every 10 shares then held by them. The transfer books close Oct. 16 and reopen Nov. 2. The right to subscribe will expire Oct. 30. The first installment of 20 per cent. on the new stock will be payable Nov. 1. Interest at the rate of 6 per cent. per annum will be charged on installments not paid on the dates called for."

The share capital was $29,974,800, and the proposed increase will make it nearly $34,000,000, on which, at the rate of 7 per cent., the dividend will require the payment of nearly $2,380,000.

Nashville, Chattanooga & St. Louis.—A Nashville, Tenn., dispatch of Oct. 13 says: "The directors of this company purchased to-day the Tennessee Coal & Iron Railroad, paying for it $500,000 in bonds that bear 6 per cent. interest and will run 30 years. The road extends from Cowan, on the line of the Nashville, Chattanooga & St. Louis, to Tracy City and the coal mines of the Tennessee Coal & Iron Railroad Co., a distance of 20 miles. The sale was confirmed by the directors of the latter road and the line transferred to the purchaser. The sale was a surprise to the public, although negotiations looking to a change in the ownership had been in progress for some time. The road runs through a mountainous region rich with coal and iron deposits and abundantly supplied with timber.

"The directors of the Nashville, Chattanooga & St. Louis decided to build the Huntsville & Elora Branch, and also to construct a branch from Sparta to the Bon Air coal fields, 13 miles from Sparta. The Huntsville & Elora road will bring the trade of Huntsville to Nashville, and add greatly to the commercial interests of the city, while the Bon Air Branch will lead to the development of coal fields that are considered very valuable."

New York Central & Hudson River.—The Genesee Falls Branch in Rochester is completed and was opened for business Oct. 9. This branch is about 1 mile long, and will be used for freight only. It has been built to reach several large breweries and other manufacturing establishments.

New York & New England.—Nothing further has been developed in relation to the many reports current about this road. The expected conference between the officers of the Boston & Albany, New York, New Haven & Hartford in relation to this road does not appear to have resulted in anything definite, but it is said that negotiations will be continued.

Norfolk & Western.—The Cripple Creek Branch of this road has been completed to Foster Falls, Va., 6½ miles beyond the late terminus at Barren Springs and 23½ miles southwest from the junction with the main line at Pulaski. The extension was opened for traffic Oct. 6.

Northern Pacific.—On the Cascade Division track is now laid for 12 miles westward from Ellensburg, Wash. Ter. The work has not advanced as fast as was expected, owing to delay in receiving rails and iron for the bridges. It is expected that the grading will be substantially completed over the whole division by the close of the year, excepting, of course, the tunnel, and the company hopes to run trains through early in the spring.

The company gives notice that the Spokane & Palouse Branch will be opened for traffic Oct. 15. This branch extends from Marshall to Belmont, Wash. Ter., and is 43 miles long. The stations on the new line, with the distances from Marshall are: Spangle, 11; Rosalia, 27; Oakesdale, 38; Belmont, 43 miles.

Oregon Improvement Co.—The statement for August and the nine months of the fiscal year from Dec. 1 to Aug. 31 is as follows:

	August.		Nine months.	
	1886.	1885.	1886.	1885.
Earnings	$317,045	$275,603	$2,069,264	$2,092,795
Expenses	199,595	207,271	1,572,723	1,677,142
Net earnings	$117,450	$68,332	$496,541	$415,653

For the nine months the gross earnings decreased $23,531, or 1.1 per cent., and the expenses $104,419, or 6.2 per cent. the result being a gain of $80,888, or 19.4 per cent., in net earnings.

Oregon Railway & Navigation Co.—The statement for September and the three months of the fiscal year from July 1 to Sept. 30 is as follows:

	September.		Three months.	
	1886.	1885.	1886	1885.
Earnings	$553,300	$577,559	$1,435,262	$1,425,893
Expenses	246,300	266,9 6	748 896	702,906
Net earnings	$307,000	$310,633	$686,293	$723,957

For the three months the gross earnings increased $8,369, or 0.6 per cent., and the expenses $46,033, or 6.5 per cent., the result being a decrease in net earnings of $37,664, or 5.2 per cent. Taxes are included in expenses.

Philadelphia & Reading.—In Philadelphia, Oct. 8, the decree for the foreclosure under the general mortgage was filed by Judge Bradley in the United States Circuit Court. The document states that as the case has been duly signed and considered, and as it has appeared satisfactory to the Court that the Reading did make default in payment of interest due in 1885 on the general mortgage bonds, that the default continues, and that holders of more than one-tenth of the bonds have petitioned for a sale of the property, it is denied that the plaintiff is entitled to have a sale of the mortgaged premises upon the failure of the defendants to pay, within a time to be hereafter fixed, the amount of the bonds and coupons now outstanding entitled to the security of said mortgage, and for the purpose of ascertaining the amount of bonds and coupons now outstanding which are entitled to the security of the said mortgage. It is further ordered that this cause be referred to George M. Dallas and James Pollock, as masters, to ascertain and report within 90 days from the date of this decree the amount due upon the bonds, principal and interest which are entitled to the security of said mortgage, and also to report what liens, if any, are prior to the bonds, or to any and what bonds secured by said mortgage; and also to ascertain and report the extent of the lien of the said mortgage upon the railroad, branches, leasehold interests, franchises and other property of the Reading, including not only the property owned by the company at the time of the execution of said mortgage, but also that which has since been acquired.

Pittsburgh & Western.—At a meeting held in Pittsburgh last week the stockholders unanimously voted to approve and confirm the lease of the Pittsburgh, Painesville & Fairport road, which gives it a connection with Lake Erie at Fairport and is expected to secure a share of the iron ore trade from the lake.

St. Paul, Minneapolis & Manitoba.—On Oct. 11 the western extension of this road was opened for business to Minot, 117.34 miles west of Devils Lake. The new terminus is at the second crossing of Mouse River and is 35.08 miles west of Denbigh, the late terminus.

Sebasticook & Moosehead Lake.—The contractors on this road have completed the grading from Pittsfield, Me., northward to Goodridge Brook, a distance of 8½ miles. Tracklaying is in progress, and the rails are down for 3 miles. The road is to run from Pittsfield, on the Maine Central, northward to Hartland, about 13 miles.

Southern Pacific.—On the coast extension of the Northern Division track is now laid to San Ardo, Cal., 8 miles south by east from San Miguel, and 73 miles from the late terminus at Soledad. The work is progressing steadily.

Strikes.—The strike of the freight brakemen on the Pine Creek line of the Fall Brook Coal Co., noted last week, came to an end in a short time, having been settled amicably. Superintendent Brown refused to cancel the objectionable order concerning brakemen riding outside, but said it had evidently been improperly enforced by conductors in a manner not intended by the company. The men returned to work, and say the whole affair was simply a misunderstanding.

We are informed that the dispatch published last week in relation to the strike of brakemen on the New York, Pennsylvania & Ohio was incorrect in stating that the men offered to submit to arbitration. The company offered to arbitrate the question, but the men refused to accede.

On Oct. 11 a deputation of the strikers held a conference with the officers of the road, but no agreement was reached. Meantime the strike had extended from the Mahoning Division to the main line, and all freight traffic was stopped. On Oct. 12, however, the main line men returned to work after a conference with General Superintendent Shaler, at which some concessions were made, including pay for overtime, passes for men going home, etc. The brakemen on the Mahoning Division, who had asked for an increase of 25 cents a day, still remained out.

Tennessee Coal, Iron & Railroad Co.—This company has finally disposed of its railroad to the Nashville, Chattanooga & St. Louis road, as noted elsewhere, and will hereafter confine its operations to its coal, iron and land business.

Texas & Pacific.—The suit of the city of Marshall against this company was heard in the United States Circuit Court at Jefferson, Tex., last week. The city, when the road was first built, gave the company a considerable subsidy in bonds and also a large tract of land, the condition being that the principal office and shops on the road should be maintained at Marshall. Recently the Receivers removed the offices from Marshall to Dallas, and the suit was brought to compel them to comply with the contract and maintaining them at Marshall.

Toledo, St. Louis & Kansas City.—This company gives notice that the new preferred stock is now ready for delivery to the bondholders of the old company who joined in the reorganization. It is also announced that the holders of the new stock will have the right to subscribe *pro rata* to the new first-mortgage bonds and common stock of the company. Each holder will be entitled for each 10 shares of preferred stock to take $1,000 in common stock and $1,000 in the new first-mortgage bonds for $1,000 in cash, payable 10 per cent. at time of subscription, 40 Nov. 15 and 50 per cent. Dec. 15. The proceeds of these bonds and stock are to be used for changing the gauge of the road, putting it in good condition and purchasing new equipment.

Wabash, St. Louis & Pacific.—In the United States Circuit Court, in Chicago, Oct. 11, Mr. Henry Crawford applied to Judge Gresham, on behalf of Thomas B. Atkins, Henry K. McKarg, Jacob Stout and Stephen H. Thayer, holders and owners of bonds secured by mortgages on the railway property until lately held by the Wabash, St. Louis & Pacific Railway Co., east of the Mississippi River, other than the Chicago Division, for leave to file a bill to foreclose the mortgaged property, and in the meantime, to have a receiver appointed in the case. The bill shows that these mortgages were given by the Toledo, Wabash & Western Railroad, Feb. 1, 1867, for $2,610,000; also by the Wabash Railway Co., May 17, 1879, for $2,000,000. Besides this there are some ten other mortgages, representing some $15,000,000 on various divisions of the Wabash system, which are prior to the mortgage of 1880, under which the Wabash system was recently sold. On all these twelve mortgages about 2¼ years' interest is over due and unpaid as well as the interest accruing during the receivership upon certain funded coupon obligations issued to represent over two years' prior unpaid interest. The lines of railroad covered by these mortgages constitute a harmonious system from Toledo, Ohio, to Burlington, Quincy, Hannibal and St. Louis on the Mississippi, and was operated for years prior to its consolidation with lines west of the Mississippi. At the time of the consolidation it had an equipment of several millions of dollars in engines, cars, etc., all subject to the mortgages of 1867 and 1879. The total sum enforceable for unpaid interest on the twelve mortgages is over $6,500,000, making a total indebtedness on the property east of the Mississippi of about $25,000,000. One of the conditions of the purchase by the committee who recently purchased under the mortgage of 1880 was that the interest due on the prior encumbrances should be paid off, but it is charged that this condition is not being carried out by the purchasers, and they are endeavoring to perfect an arrangement by which the prior mortgagees were to allow the purchasers to go into possession of the property and accept reduced security at a reduced interest, which the majority of the bondholders refuse to accept. After making numerous charges against the present receivers and the purchasers, the Court is asked to decree a foreclosure and sale under the prior mortgages and appoint an independent and competent Receiver to manage the property.

Judge Gresham ordered copies of the bill and notices of the motion to be served on all parties interested ordering them to appear on Oct. 19, when the whole matter will be heard as well as the motion for the appointment of a receiver for the Chicago Division which is set for that day.

Waldo & Lake City.—This company has been organized to build a railroad from Waldo, Fla., on the Southern Division of the Florida Railway & Navigation Co.'s line, northwest to Lake City, on the western division of the same company's line. The distance is about 40 miles, and the company promises to begin work at once. The projected line will shorten considerably the distance to all points in the south of Florida for passengers coming from the West.

Western Maryland.—The citizens of Baltimore will vote at the coming municipal election on an ordinance providing for issuing $1,800,000 city bonds, to enable the Western Maryland Railroad Co. to pay and extinguish all of its first and second preferred mortgage bonds and the overdue coupons thereon, except such of said bonds and coupons as are held by the city of Baltimore, and to pay and extinguish all the bonds of the company secured by its second mortgage and guaranteed by the Mayor and City Council of Baltimore, and by the county commissioners of Washington County, and to provide a sinking fund for the redemption of said stock.

ANNUAL REPORTS

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette:*

Cincinnati, Indianapolis, St. Louis & Chicago.

This company owns a line from Cincinnati through Indianapolis to LaFayette, Ind., 174.9; the Lawrenceburg Branch, 2.6; the Cincinnati, LaFayette & Chicago, LaFayette to Kankakee, Ill., 75.5; the Harrison Branch, 7.4; the Fairland, Franklin & Martinsville, 38.2; the Vernon, Greensburg & Rushville, 44.4; a total of 343 miles. The report is for the year ending June 30 last.

The company also owns one-half interest in the Kankakee & Seneca, 42.3 miles, and controls the Columbus, Hope & Greensburg, 24.5 miles. Those roads are not included in the report below.

The equipment includes 77 locomotives; 53 passenger, 3 parlor, 6 chair, 7 postal and 17 baggage; 1,914 box, 193 stock, 728 flat, 162 coal and 38 caboose cars; 1 directors' car, 1 pay car and 18 service cars.

The general account was as follows:

Capital stock		$7,000,000
Funded debt		7,430,000
Accounts and balances		418,149
Profit and loss		1,157,933
Total		$16,006,082
Road and equipment	$13,057,179	
Securities and other property	2,211,348	
Advances to branch lines	424,464	
Supplies on hand	97,787	
Accounts and balances receivable	177,007	
Cash	38,298	
		$16,006,082

Stock was not changed during the year. The funded debt decreased $15,500. It consists of $1,598,500 Indianapolis & Cincinnati 7s; $499,000 Cincinnati & Indiana firsts, $1,329,000 seconds and $33,500 funded coupons; $2,790,000 Indianapolis, Cincinnati & LaFayette 7s; $1,180,000 general mortgage 6s. Under leases and contracts the company also pays interest on $1,120,000 Cincinnati, LaFayette & Chicago 7s and $450,000 Vernon, Greensburg & Rushville 7s.

The earnings for the year were as follows:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Freight	$1,540,902	$1,543,129	D. $2,227	0.1
Passenger	729,514	795,533	D. 66,019	8.3
Mail, etc	155,977	156,112	D. 135	0.1
Total	$2,426,413	$2,494,794	D. $68,381	2.7
Expenses	1,540,062	1,660,180	D. 120,118	7.2
Net earnings	$886,351	$834,614	I. $51,737	6 2
Gross earn. per mile	7,074	7,274	D. 200	2.7
Net " "	2,584	2,433	I. 151	6.2
Per cent. of exps	63.5	66 5	D. 3.0	....

Expenses include taxes, which amounted to $59,570 last year, against $57,342 in the preceding year.

The income account for the year was as follows:

Net earnings, as above		$886,351
Miscellaneous receipts		100,522
Total		$986,873
Interest on bonds	$624,234	
Rentals	10,098	
Miscellaneous charges	8,746	
Dividends, 3 per cent	210,000	
		853 078
Balance, surplus for the year		$133,795
Surplus, July 1, 1885		1.024,138
Total surplus, June 30, 1886		$1,157,933

Three quarterly dividends of 1 per cent. each were paid. The surplus was equivalent to 1.91 per cent. additional on the stock. Charges to construction account for the year amounted to $34,156.

The traffic for the year was as follows:

	1885-86.	1884-85.	Inc. or Dec.	P.c.
Pass. train miles	791,441	854,167	D. 62,746	7.3
Freight " "	868,318	930,265	D. 61,947	6.7
Total loco. miles	2,392 781	....	.. ..	...
Pass. car miles	3 821,433	4,028,318	D. 206,885	5.1
Freight " "	20,406,746	21,663,635	D. 1,256,889	5.8
Passengers carried	894,796	964,888	D. 70,092	7.3
Passenger-miles	31,812,992	35,744,758	D. 3.931,766	11.0
Tons freight carried	1 454,881	1,442,663	I. 12.218	0 9
Ton-miles	172,841,637	174,608,590	D. 1,766,953	1.1
Av. train load:				
Passengers, No	40.2	41.8	D. 1.6	3.8
Freight, tons	199.1	187.7	I. 11.4	6.1
Average rate:				
Per passenger-mile	2.29 cts.	2.22 cts.	I. 0.07 ct.	3.2
Per ton-mile	0.88 "	0.98 "	D. 0.01 "	1.1

The average passenger journey last year was 36.56 miles; the average freight haul was 118.81 miles. The earnings per train-mile were: Through passenger, $1.34; commutation, $0.60; branch, $0.41; freight, $2.04. Of the freight car mileage 78.5 per cent. was of loaded cars. Locomotives ran 1.43 miles to each revenue train mile.

During the year 10.43 miles of track were renewed with 67-lb. steel rails, the lighter steel taken up being used to replace iron on the branches. There were 5.47 miles of track ballasted with gravel. Four new station buildings were erected and others repaired. Four iron bridges were built to replace wood and 486 ft. of trestle rebuilt.

President Ingalls' report says: "The result is very satisfactory when the general condition of business and of railroad earnings during the said period is considered. For the first five months of the year extreme low rates on sea-board business prevailed. During the entire year competition was sharp and severe, owing to light traffic on account of short crops. Our chief loss was in the failure of the wheat crop along our lines. This not only reduced our freight earnings, but was seriously felt in the decrease of passenger travel and the shipments of miscellaneous merchandise, as people depend largely on the wheat crop for their surplus money with which to travel or buy goods. Fortunately, we had a good corn crop. By a conservative course we have been able to hold, and in some classes of traffic increase, our rates over previous years. The policy of improving and enlarging the plant has been continued. Sixty-seven pound steel rail has been laid in the main track, and the 56-pound steel taken up and used for side tracks and on the branches. Iron bridges have been built to take the place of wooden ones; heavy masonry where the old was giving way or was too light; ballast has been distributed in needed places; new equipment has been bought to replace old and worn out. The directors, taking advantage of the present low price of iron and labor, have closed contracts for the renewal of the remaining wooden bridges on the main line with iron during the coming year."

"During the year the directors thought it a good time to commence refunding the debt of the company in a long-time bond bearing a low rate of interest. Upon the lines owned and controlled by the company there were, of every kind and name, $9,000,000 of bonds, all bearing 7 per cent, except $1,180,000, which were 6 per cent. They were secured by seven different mortgages, none of which covered all of the lines, and were due at different times. This made them an undesirable bond for investors to hold. In addition to these $9,000,000, there were liabilities of branch lines, for which this company was virtually an indorser, outstanding for about $300,000. A new mortgage covering all the lines and property of the company was prepared, securing $10,000,000 of bonds at 4 per cent, due in 50 years, interest and principle payable in gold. As this is a long bond, payable in gold, and of unquestioned security, it is a desirable investment for estates and trusts. Provision was made that $1,000,000 could be sold and the proceeds used by the company for new equipment, payment of the $300,000 heretofore referred to, and for payment of the old bonds as the directors might determine, and that the remaining $9,000,000 should only be sold or exchanged upon the payment and surrender of an equal amount of the old bonds. Of these $1,000,000 were sold in June last at par, to be delivered in August, and the operation of exchanging the old bonds for the new 4s is now being carried on.

"The outstanding bonds, as previously stated, are due at different times. It is believed, however, that they can all be exchanged for the new bonds at a fair premium. When this is accomplished the interest charges of the company will be but $400,000 per year, a saving of $224,000, or 3 per cent. on the present stock. The sale of the first $1,000,000 has furnished means wherewith to pay a large amount of premiums, but if the exchange is pressed at once a further sum will be required, for providing which the directors will at some future time lay before you a plan. The directors congratulate you upon the improvement in your financial condition during the last year, and upon the fact that your credit is so high as to enable you to sell a 4 per cent. bond; this satisfactory position being attained, as they believe, from the fact that the company in the past three years has devoted the net earnings to the enlargement and improvement of the property instead of dividing them, thus creating a basis for credit; and to the location of its lines, which insure it a fair business even in dull times.

"A contract has just been concluded with the Illinois Central Railroad Co. for an entrance into Chicago and terminals there for 100 years. By this contract the company obtains the right to manage its own affairs in Chicago, naming its own rates and conducting its own business, and paying therefor a percentage of the gross income of the business to and from Chicago over its line, the contract being especially favorable from the fact that if business is dull the payments will be light, and if good the company can afford to meet them, and, further, the Illinois Central Railroad has very large and very convenient grounds in Chicago, and within a few months will have a double track the entire distance to Kankakee, and is already using six tracks for quite a distance out of Chicago, thus giving every facility for the conduct of your business."

Western Union Telegraph Co.

The report for the year ending June 30 gives the following figures for the earnings and expenses of the year:

Gross earnings		$16,298,638
Expenses		12,378 783
Net earnings		$3,919,855
Interest on bonds	$494,461	
Sinking funds	39,491	
Dividends, 4¼ per cent	3,399,573	
		3,934,025
Deficit for the year		$14,170
Surplus, July 1, 1885		4,324,004
Surplus, July 1, 1886		$4,309,834

The expenses for the year were:

For operating and general expenses	$8,510,658
For rentals of leased lines	1.892,347
For maintenance and reconstruction	1,273,125
For taxes	499,492
For equipment of offices and wires	203,061
Total expenses as above	$12,373.783

President Green says: "While the volume of traffic has continued to increase, the tables show a material reduction in revenues, principally in the cable, gold and stock and commercial news earnings. It will be remembered that for one-half of the previous year the cable rates were 50 cents per word, with no competition, while during the year covered by the foregoing statement there was active competition, and for a portion of the year cable business was done at the 12-cent rate, which had not been in operation long enough before the close of the year to develop the large increase in messages. Notwithstanding continued reductions in rates, the earnings from land lines' service have been well maintained, the falling off in earnings from messages transmitted over the land lines being less than the increase from wire rentals.

"There was an increase of 1,193,224 in the number of messages sent, and the increase in messages sent over rented wires, of which no account can be taken, must have been several millions more.

"The average rate received for messages sent over the land lines operated by the company has been reduced to 30.9 cents per message, while the average cost pertaining to the conduct of the business of the company in the transmission and delivery of messages is reduced to a fraction under 24 cents per message, showing a reduction in the receipts of 1.2 cents per message and a reduction in the cost of handling messages precisely the same.

"It has been demonstrated that, with two or more competitors reaching all the principal commercial centres east of the Rocky Mountains, and with some of the rates cut below the cost of the service, the company still maintains an earning capacity equal to more than 4 per cent. on its capital stock, above fixed charges."

Chicago & Eastern Illinois.

This company owns a line from Dolton, Ill., to Danville, 107.5 miles, with branches from Danville to Sidell's Grove, 22 miles; Cissna Park, Ill., to Wellington, 13 miles, and Covington, Ind., to Coal Creek, 10.5 miles. It leases the Evansville, Terre Haute & Chicago road, Danville to Terre Haute, Ind., 55 miles, and the Indiana Block Coal road, Terre Haute Junction to Brazil, Ind., 14 miles. It also leases the the use of the Chicago & Western Indiana road from Dolton to Chicago, 17 miles, and of the Indiana, Bloomington & Western road from Danville to Covington, Ind., 13 miles. This makes a total of 153 miles owned and 252 miles worked. The report is for the year ending June 30.

The general account is as follows, condensed:

Stock		$3,000,000
Funded debt		6,000,000
Bills payable		115,600
Other accounts		246 967
Coupons and unclaimed dividends		10,313
Miscellaneous liabilities		30,027
Income accounts		515,047
Total liabilities		$9,926.354
Road & equipments, etc	$9,385,243	
Accounts and cash receivable	142,106	
Materials, fuel	66,260	
Bonds held	235,956	
Cash on hand	28,881	
Miscellaneous items	67,908	
		$9,926,354

The securities owned include $200,000 of the company's consolidated bonds. The funded debt consists of $3,000,000 first mortgage bonds; $250,000 first-mortgage extension bonds; $250,000 Danville & Grape Creek bonds; $1,000,000 income bonds and $1,500,000 consolidated bonds. The total issue of consolidated bonds authorized is $6,000,000, of which $4,500,000 are reserved by the terms of the mortgage to exchange for the prior issues.

The earnings for the year were as follows:

	1885-86.	1884-85.	Inc. or Dec.	P. c.
Freight	$1,302,138	$1,213.148	I $88.990	7.3
Passengers	315.282	282,365	I. 32.917	11.7
Mail and express	47,192	46 399	I. 793	1.7
Other	59,952	58,231	I. 1,721	2.9
Total	$1,724.564	$1,600.143	I. $124,421	7.8
Expenses	1,011,557	955,545	I. 56,012	5.9
Net earnings	$713.007	$644.598	I. $68,409	10.6
Gross earn. per mile	6.844	6 350	I. 494	7.8
Net " "	2 828	2,558	I. 270	10 6
Per cent. of exps	58.7	59.7	D. 1.0	....

Expenses include taxes in both years. The increase in both gross and net earnings was very considerable.

The expenses were divided as follows:

	1885-86. Amount.	P. c.	1884-85 Amount.	P. c.
Conducting transportation	$348,442	20.2	$310,581	19.4
Motive power	251,275	14.6	236,979	14.9
Maintenance of cars	85 938	5.0	73,086	4.5
Maintenance of way	164,727	9.5	162.721	10.2
General expenses	57,402	3.3	67,845	4.2
Taxes	54,421	3.2	48,348	3.0
Chi. & W. Ind. exps	49,353	2.9	55,985	3.5
Total	$1,011,557	58.7	$955,545	59.7

The Chicago & Western Indiana expenses are in proportion of the expenses of that road which the company is called on to pay under the contract.

The income statement for the year is as follows:

Net earnings, as above		$713,007
Miscellaneous income		98.824
Total		$811,831
Interest paid on bonds	$336,690	
Rentals paid	211,512	
Interest and discount	4,595	
Dividend, 2½ per cent	75,000	
		627,797
Balance, surplus for the year		$184,034

Charges for new construction during the year were $74,067, and for new equipment $304,935; a total of $379,002 for additions to property.

The equipment has been increased during the year by 4 locomotives, 6 passenger coaches, 2 mail and express cars, 200 coal cars, 100 box cars, 50 stock cars, and 50 flat cars. The road-bed and track have been maintained in first-class condition, 5.2 miles of track have been relaid with steel rails, 66,134 new cross-ties have been put in, and 26½ miles have been re-ballasted.

Louisville & Nashville.

The report of this company for the year ending June 30, as presented at the annual meeting last week, gives some information in addition to the statement heretofore published.

The statement of bonded debt is as follows:

Bonded debt, July 1, 1885		$61,958,314
General morigage bonds issued		101,000
Total		$62,059,314
Bonds redeemed	$401,680	
Car-trust bonds paid	324,380	
		726,060
Bonded debt, June 30, 1885		$61,333,254

This shows a net reduction of $625,060 during the year. In addition $640,000 Louisville city 6s lent to the company were paid off.

The total mileage of road owned and controlled is:

	Miles.
Lines operated directly	2.023
Lines controlled but not operated	902
Lines held as joint lessee (Georgia R. R.)	679
Total	3,604

In addition the company owns 84 miles of road which are leased to other companies. Of the lines operated directly 1,612 miles are owned, 222 leased and 189 worked under contract.

A statement of expenditures outside of the operations of the road is as follows:

Surplus over fixed charges		$527,803
General mortgage bonds issued		101,000
Bonds sold		1,696,733
Stocks sold		556,518
General account, charges		1,714,281
Profit and loss		61,842
Total		$4 658,157
Bonds purchased	$1,836,410	
Bonds redeemed	1,375.059	
Stocks purchased	27,731	
Floating debt	319.359	
Advances	463,971	
Materials	99,527	
New construction	503,117	
Bills receivable	32,983	
		$4,658,157

The floating debt on June 30, 1886, compared with June 30, 1885, is as follows:

	1885-86.	1884-85.
Bills payable	$41,229	$189,279
Bills and pay-rolls for June	1,149,753	924.369
Interest due July 1 and Aug. 1	501.529	499.423
Sundry open accounts	456,509	170,575
Total	$2,149.020	$1,783,656

The fixed charges for the current year, less credits, are estimated at $4,260,877; sinking funds, $568,267; car-trust payments, $340,658; liability on Pensacola & Atlantic and Owensboro & Nashville bonds guaranteed, $189,600; a total of $5,359,402 for the year.

GEORGIA RAILROAD.

The fifth year of the lease of the Georgia Railroad (in which this company is jointly interested with the Central Railroad Co., of Georgia) shows as follows:

Gross earnings	$1,322,819
Income from investments	77,268
Total income	$1,400,087
Expenses and improvements	861,503
Net income for the year	$538,584

The annual rent paid by this company and the Central Railroad of Georgia is $600,000.

This shows a loss for the year of	$61,416
There was also advanced to Gainsv., Jeff. & Sou. R. R. during the year	28,214
Making a total outlay under the lease, 1885-86	$89,630

This company's share of above (one-half), $44,815, has been charged against income account.